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Federal Aviation Administration

Federal Aviation Regulations

Part 125
Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More

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Introductory Note

Part 125 effective February 3, 1981, is codified under Subchapter G, Air Carriers, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations, of Title 14 of the CODE OF FEDERAL REGULATIONS.

Part 125—Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More

Contents

Section		*Page*
Preambles		P-1
	Subpart A—General	
125.1	Applicability	1
125.3	Deviation authority	1
125.5	Operating certificate and operations specifications required	1
125.7	Display of certificate	2
125.9	Definitions	2
125.11	Certificate eligibility and prohibited operations	2
	Subpart B—Certification Rules and Miscellaneous Requirements	
125.21	Application for operating certificate	2
125.23	Rules applicable to operations subject to this Part	3
125.25	Management personnel required	3
125.27	Issue of certificate	3
125.29	Duration of certificate	3
125.31	Contents of certificate and operations specifications	4
125.33	Operations specifications not a part of certificate	4
125.35	Amendment of operations specifications	4
125.37	Duty time limitations	4
125.39	Carriage of narcotic drugs, marihuana, and depressant or stimulant drugs or substances	5
125.41	Availability of certificate and operations specifications	5
125.43	Use of operations specifications	5
125.45	Inspection authority	5
125.47	Change of address	5
125.49	Airport requirements	5
125.51	En route navigational facilities	5
125.53	Flight locating requirements	6
	Subpart C—Manual Requirements	
125.71	Preparation	6
125.73	Contents	6
125.75	Airplane flight manual	7
	Subpart D—Airplane Requirements	
125.91	Airplane requirements: general	8
125.93	Airplane limitations	8

Contents—Continued

Section		*Page*
	Subpart E—Special Airworthiness Requirements	
125.111	General	8
125.113	Cabin interiors	8
125.115	Internal doors	9
125.117	Ventilation	9
125.119	Fire precautions	9
125.121	Proof of compliance with § 125.119	10
125.123	Propeller deicing fluid	10
125.125	Pressure cross-feed arrangements	10
125.127	Location of fuel tanks	10
125.129	Fuel system lines and fittings	10
125.131	Fuel lines and fittings in designated fire zones	11
125.133	Fuel valves	11
125.135	Oil lines and fittings in designated fire zones	11
125.137	Oil valves	11
125.139	Oil system drains	11
125.141	Engine breather lines	11
125.143	Firewalls	11
125.145	Firewall construction	11
125.147	Cowling	11
125.149	Engine accessory section diaphragm	11
125.151	Powerplant fire protection	11
125.153	Flammable fluids	12
125.155	Shutoff means	12
125.157	Lines and fittings	12
125.159	Vent and drain lines	12
125.161	Fire-extinguishing systems	12
125.163	Fire-extinguishing agents	12
125.165	Extinguishing agent container pressure relief	13
125.167	Extinguishing agent container compartment temperature	13
125.169	Fire-extinguishing system materials	13
125.171	Fire-detector systems	13
125.173	Fire detectors	13
125.175	Protection of other airplane components against fire	13
125.177	Control of engine rotation	13
125.179	Fuel system independence	13
125.181	Induction system ice prevention	13
125.183	Carriage of cargo in passenger compartments	14
125.185	Carriage of cargo in cargo compartments	14
125.187	Landing gear: aural warning device	14
125.189	Demonstration of emergency evacuation procedures	15
	Subpart F—Instrument and Equipment Requirements	
125.201	Inoperable instruments and equipment	15
125.202	[Removed]	16
125.203	Radio and navigational equipment	16
125.205	Equipment requirements: airplanes under IFR	16
125.206	Pitot heat indication systems	17
125.207	Emergency equipment requirements	17
125.209	Emergency equipment: extended overwater operations	18

Contents—Continued

Section		Page
125.211	Seat and safety belts	18
125.213	Miscellaneous equipment	19
125.215	Operating information required	19
125.217	Passenger information	20
125.219	Oxygen for medical use by passengers	20
125.221	Icing conditions: operating limitations	20
125.223	Airborne weather radar equipment requirements	21
[125.224	Traffic Alert and Collision Avoidance System]	21
125.225	Flight Recorders	21
125.227	Cockpit voice recorders	22-1

Subpart G—Maintenance

125.241	Applicability	22-2
125.243	Certificate holder's responsibilities	22-2
125.245	Organization required to perform maintenance, preventive maintenance, and alteration	22-2
125.247	Inspection programs and maintenance	22-2
125.249	Maintenance manual requirements	22-3
125.251	Required inspection personnel	23

Subpart H—Airman and Crewmember Requirements

125.261	Airman: limitations on use of services	23
125.263	Composition of flightcrew	23
125.265	Flight engineer requirements	23
125.267	Flight navigator and long-range navigation equipment	24
125.269	Flight attendants	24
125.271	Emergency and emergency evacuation duties	24

Subpart I—Flight Crewmember Requirements

125.281	Pilot-in-command qualifications	24
125.283	Second-in-command qualifications	24
125.285	Pilot qualifications: recent experience	24
125.287	Initial and recurrent pilot testing requirements	25
125.289	Initial and recurrent flight attendant crewmember testing requirements	26
125.291	Pilot in command: instrument proficiency check requirements	26
125.293	Crewmember: tests and checks, grace provisions, accepted standards	27
125.295	Check airman authorization: application and issue	27
125.297	Approval of airplane simulators and other training devices	27

Subpart J—Flight Operations

125.311	Flight crewmembers at controls	28
125.313	Manipulation of controls when carrying passengers	28
125.315	Admission to flight deck	28
125.317	Inspector's credentials: admission to pilots' compartment: forward observer's seat	28
125.319	Emergencies	28
125.321	Reporting potentially hazardous meteorological conditions and irregularities of ground and navigation facilities	29

Contents—Continued

Section *Page*

125.323 Reporting mechanical irregularities 29
125.325 Instrument approach procedures and IFR landing minimums 29
125.327 Briefing of passengers before flight 29
125.329 Minimum altitudes for use of autopilot 30
125.331 Carriage of persons without compliance with the passenger-carrying requirements of this Part 30

Subpart K—Flight Release Rules

125.351 Flight release authority 30
125.353 Facilities and services 31
125.355 Airplane equipment 31
125.357 Communication and navigation facilities 31
125.359 Flight release under VFR 31
125.361 Flight release under IFR or over-the-top 31
125.363 Flight release over water 31
125.365 Alternate airport for departure 31
125.367 Alternate airport for destination: IFR or over-the-top 32
125.369 Alternate airport weather minimums 32
125.371 Continuing flight in unsafe conditions 32
125.373 Original flight release or amendment of flight release 32
125.375 Fuel supply: nonturbine and turbopropeller-powered airplanes 32
125.377 Fuel supply: turbine-engine-powered airplanes other than turbopropeller 33
125.379 Landing weather minimums: IFR 33
125.381 Takeoff and landing weather minimums: IFR 33
125.383 Load manifest 34

Subpart L—Records and Reports

125.401 Crewmember record 34
125.403 Flight release form 34
125.405 Disposition of load manifest, flight release, and flight plans 35
125.407 Maintenance log: airplanes 35
125.409 Reports of defects or unairworthy conditions 35
125.411 Airworthiness release or maintenance record entry 35

Appendix A

Additional Emergency Equipment 37

Appendix B

Criteria for Demonstration of Emergency Evacuation Procedures Under § 125.189 41

Appendix C

Ice Protection 43

[Appendix D]

[Airplane Flight Recorder Specifications] 44–1
Special Federal Aviation Regulation 38–2, 38–3, 38–4: Certification and Operating Requirements (*Preambles*) 45
Special Federal Aviation Regulation 38–2 (*Rule*) 53

Establishment of New Part 125
Prescribing Certification and Operation Rules for Certain Large Airplanes

Adopted: October 2, 1980

Effective: February 1, 1981
Revocation of Part 123 is effective January 1, 1983

(Published in 45 FR 67214, October 9, 1980)

SUMMARY: These amendments establish a uniform set of certification and operation rules for large airplanes having a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more when used for any purpose other than common carriage. These rules substantially upgrade the level of safety applicable to large airplanes formerly operated under Part 91, which provides basic general operating and flight rules for all operations. The number and types of accidents involving large airplanes operating under Part 91 demonstrate the need for this upgrading. Moreover, because the applicability of these rules does not depend upon a compensation or hire test, they enhance the FAA's capability to ensure that many more members of the public are afforded a higher level of safety. This rule is the final step in a regulatory upgrade and modernization program that has become essential with the continued deregulation of air transportation.

FOR FURTHER INFORMATION CONTACT: Harold E. Smith, Regulatory Projects Branch (AVS-24), Safety Regulations Staff, Associate Administrator for Aviation Standards, 800 Independence Avenue, SW., Washington, D.C. 20591, Telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Notice of Proposed Rule Making

These amendments are based on Notice of Proposed Rule Making 79-19 (44 FR 66324; November 19, 1979). All interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. Except for the changes discussed below, these amendments and the reasons for their adoption are the same as those stated in Notice 79-19.

Background of This Rulemaking Proceeding

This rule culminates an extended effort by the FAA to upgrade and standardize the regulations applicable to certain large airplanes used in noncommon (private) carrier commercial operations (carriage other than common carriage is private carriage). In 1970, the Secretary of Transportation directed the Assistant Secretary for Safety and Consumer Affairs, Office of the Secretary of Transportation, to conduct an indepth study of charter operations utilizing large airplanes. Notice 79-19 summarizes the recommendations made as a result of that study. In short, the study recommended that new regulations be developed for large airplanes, pressurized airplanes, and turbine-powered airplanes engaged in noncommon carriage. Emphasis was placed on achieving a standard appropriate to the operation of transport category airplanes, including requirements for crew proficiency, operations, and airworthiness, that would provide a level of safety which compares favorably with Part 121. The study also recommended the establishment of a new part in the Federal Aviation Regulations (FAR) which only apply a single set of regulations to large airplanes used for various purposes, including those used for compensation or hire but excluding common carriage which would continue to be regulated under Part 121. One important feature of those recommendations was that "FAA field inspectors would no longer be required to make an economic determination of what constitutes operation 'for compensation or hire.'" The antique nature of the "compensation or hire" test is illustrated by the fact that it originated with the regulation of ground transportation under the Interstate Commerce Act which was enacted in the late 1800's. The test is presently contained in the definition of a "commercial operator" in the FAR and is essentially the same as the definition adopted in 1949 by the Civil Aeronautics Board. Section 1.1 defines "commercial operator" as "a person who, for

compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. . . ." Where it is doubtful whether the operations are "for compensation or hire," the test has been "whether the carriage by air is merely incidental to the person's other business or is, of itself, a major enterprise for profit."

The FAA partially implemented the recommendations of the 1970 Department of Transportation Task Force in 1972 with the adoption of new Subpart D of Part 91, which was the initial step in upgrading the level of safety applicable to large airplanes.

Since 1972 the FAA has carefully monitored the operating experience of large airplanes engaged in noncommon carriage operations. There are a number of significant aspects to this operating experience. First, and perhaps the key aspect, is the fact that the ecomonic test of "compensation or hire" has proved to be a nebulous guide to both the FAA and the aviation community in attempting to determine whether the operations fall within Subpart D of Part 91 or under the commercial operator regulations of Part 121. The agency found that many sham arrangements have been developed by some operators to mask de facto commercial operations so that they can be conducted under Part 91. Despite the FAA's efforts to detect these illegal operations, frequently it is only after an accident or incident that sufficient facts are available to unmask the illegal operator. Once the unfortunate event occurs, the violator is subject to enforcement action. It would be far better, however, for the accident or incident to have been prevented. The difficulties in application of the "compensation or hire" test are not limited to the unscrupulous operator. There have been instances in which a lessee of a large airplane has assumed responsibility unwittingly for its operation without recognizing the obligations. Many operators who desire to comply with the applicable regulations have, in good faith, experienced confusion over whether they are entitled to operate under Part 91 or whether they are required to obtain a commercial operator certificate. Many interpretations have been sought and issued, which require substantial time and effort on the part of the public and FAA personnel.

Another aspect of the operating experience involving U.S.-registered large airplanes, ostensibly operating under Subpart D, is the significant number of accidents which have occurred. Post-accident investigations indicate a wide range of deficiencies, including defective engines, failure of the crew to hold proper certificates, improper flight planning, improper operating technique, and failure to ascertain weight and balance limitations. This rule should preclude the occurrence of many of these types of accidents. The following table lists some of the accidents involving large airplanes operating under Part 91 which occurred in the period 1972–1979. This table was developed from National Transportation Safety Board data.

REPRESENTATIVE LARGE AIRPLANE ACCIDENTS IN PART 91 OPERATIONS
1972–79 (Source—NTSB Data)

Date	*Type of Airplane*	*Description of Accident*	*Deficiencies Noted in Accident Investigation*
12/31/72	Douglas DC–7	Crashed after takeoff—fatalities	Engine failure—maintenance
2/21/73	Curtiss C–46	Forced landing en route—fatalities	Maintenance
4/3/73	Lockheed 1049	Right gear retracted	Downlock failed—maintenance
6/21/73	Douglas DC–7	Lost control—initial climb—fatalities	Turbulence and inflight fire—maintenance
8/5/73	Lockheed 1049	Forced landing—en route	Improper fuel transfer—circuit breaker corroded—maintenance
9/10/73	Convair 880	Landing—stall	Large storm over approach path

REPRESENTATIVE LARGE AIRPLANE ACCIDENTS IN PART 91 OPERATIONS

1972–79 (Source—NTSB Data)—*Continued*

Date	*Type of Airplane*	*Description of Accident*	*Deficiencies Noted in Accident Investigation*
9/24/73	Lockheed 1049	Landing gear failure	Maintenance
10/23/73	Curtiss C–46	Forced landing–approach	Fuel contamination–maintenance
12/15/73	Lockheed 1049	Overrotated at liftoff–fatalities	Unqualified crew–loaded out of center of gravity
12/27/73	Douglas DC–3	Collided with trees	Fuel mismanagement–landed on road
12/30/73	Douglas DC–3	Collided with trees	Engine failure–icing conditions–no deice fluid–maintenance
4/18/74	Douglas DC–2	Forced landing–en route	Fuel contamination–gear not locked down–maintenance
1/1/75	Douglas DC–3	Forced landing–en route	Propeller erratic–other engine overheat–maintenance
1/2/75	Douglas DC–4	Collided with fence on takeoff	Unsuitable terrain–unqualified crew
1/2/75	Douglas DC–3	Collided with wires on approach–fatalities	Below minimum conditions
2/9/75	BAC–111	Directional control–takeoff	Hit snow bank–low visibility takeoff
5/11/75	Lockheed 1049	Hit trees–fatalities	Engine malfunction–maintenance
6/16/75	Martin 404	Forced landing on takeoff	Engine malfunction–maintenance
8/23/75	Douglas DC–3	Lost directional control–takeoff	Gusting to 45K–hit fence–ditch
9/11/75	Douglas DC–3	Collided with trees–fatalities	Oxygen masks used–no oxygen in system
1/4/76	Douglas DC–3	Forced landing–en route	Engine failure–unauthorized repair
2/19/76	Lockheed 1049	Forced landing–en route	Malfunction–maintenance
4/4/77	Douglas DC–3	Forced landing after takeoff	Engine failure–maintenance –inadequate flight planning
4/22/76	Boeing 720	Lost control on approach	Failure to maintain proper airspeed
10/13/76	Boeing 707	Crashed on takeoff–fatalities	Improper pilot technique–loading
3/3/77	Douglas DC–4	Landing roll gear collapse	PIC selected unsuitable terrain
3/17/77	Douglas DC–3	Airplane nosed over on landing	PIC selected unsuitable terrain
3/18/77	Douglas DC–3	Airplane swerved on landing, resulting in collision with fence posts	PIC lost directional control on landing
4/9/77	Convair 240	Forced landing–en route	Fuel contamination–inadequate maintenance
4/14/77	Douglas DC–3	Overshot landing	Touchdown on last ⅓ of 7,000-foot runway

REPRESENTATIVE LARGE AIRPLANE ACCIDENTS IN PART 91 OPERATIONS
1972-79 (Source—NTSB Data)—*Continued*

Date	*Type of Airplane*	*Description of Accident*	*Deficiencies Noted in Accident Investigation*
5/6/77	Curtiss C-46	Forced landing—en route	Engine failure—maintenance
6/13/77	Douglas DC-3	Airplane landed long, resulting in gear collapse	PIC selected unsuitable landing area lighted by flashlights
9/12/77	Douglas DC-7B	Forced landing—takeoff—fatalities	Over gross—improper fuel—maintenance
10/13/77	Curtiss C-46F	Wheels-up landing	Hydraulic system failure—PIC lacked familiarity with airplane and failed to follow approved procedures
10/20/77	Convair 240	Forced landing—en route —fatalities	Fuel exhaustion—maintenance
3/21/78	Convair 340	Off airport forced landing	Oil supply exhaustion caused engine fire and subsequent engine separation from airplane
5/12/78	Convair 440	Forced landing in water	Power loss due to internal failure of engine—PIC failed to make proper decision
5/25/78	Convair 880	Gear collapse during aborted takeoff	Takeoff aborted when PIC unable to rotate due to forward center of gravity—improper loading—supervisory error—PIC failed to plan flight properly
7/22/78	Curtiss C-46	Forced landing on approach	Maintenance
9/4/78	Convair 240	Crash on takeoff—fatalities	Engine failure due to water in fuel—PIC lacked familiarity with airplane and exercised poor judgment—PIC did not have type rating in CV-240
9/6/78	Douglas DC-7C	Airplane was flown into ground—fatalities	PIC misjudged distance from ground—PIC failed to plan flight properly
10/1/78	Douglas DC-3	Forced landing in water—fatalities	Electrical system failure—pilot became lost and fuel supply became low
10/30/78	Douglas DC-3	Nose-over on landing	PIC did not have multi-engine rating or type rating—PIC attempted operation which exceeded capability
11/29/78	Convair 240	Lost directional control—fatalities	Improper procedures
12/2/78	Douglas DC-3	Undershot runway	Aircraft landed 300 feet short of runway
12/5/78	Douglas DC-3	Crash on takeoff—fatalities	PIC did not have multi-engine rating or type rating—takeoff attempted with elevator gust lock installed—PIC attempted operation which exceeded capability

REPRESENTATIVE LARGE AIRPLANE ACCIDENTS IN PART 91 OPERATIONS
1972-79 (Source—NTSB Data)—*Continued*

Date	*Type of Airplane*	*Description of Accident*	*Deficiencies Noted in Accident Investigation*
12/11/78	Douglas DC-3	Collision with trees during forced landing—fatalities	PIC mismanaged fuel, resulting in fuel starvation and failure of both engines—PIC not qualified to operate airplane
12/14/78	Douglas DC-3	Crash on landing	PIC selected unsuitable landing area and misjudged distance and speed
1/10/79	Douglas DC-3	Crash on landing	Unsuitable terrain—unlighted field
1/21/79	Douglas DC-3	Airplane swerved on landing	PIC did not compensate properly for unfavorable wind conditions
4/16/79	Convair 340	Airplane went off end of runway	Engine failure on takeoff—maintenance
5/15/79	Douglas DC-4	Airplane collided with dirt bank on takeoff	PIC attempted takeoff with gust locks engaged—PIC failed to use checklists and failed to plan flight properly
6/6/79	Douglas DC-6	Overshot runway	Landed long—crashed down embankment
6/12/79	Douglas DC-3	Airplane crashed on takeoff—fatalities	PIC lifted airplane off ground prematurely, causing stall—PIC failed to follow procedures
6/22/79	Douglas DC-7C	Airplane crash landed after power loss on 2 engines—fatalities	Improper grade of fuel used—airplane loaded improperly as to weight and center of gravity—PIC did not plan flight properly
6/27/79	Douglas DC-3	Overshot runway	Landed long in fog—ground looped to stop
6/29/79	Martin 404	Struck terraced ground	Pilot blinded—dirty, coated windshield
7/13/79	Douglas DC-3	Forced landing—en route	Fuel exhaustion
8/25/79	Convair 440	Gear-up landing	Gear and stabilizer parts missing—maintenance
9/14/79	Douglas DC-7B	Collided with trees—fatalities	Night departure—hit trees 24 miles from airport
9/28/79	Curtiss C-46	Forced landing—en route	Engine failure—maintenance
11/19/79	Douglas DC-4	Collided with trees—fatalities	Final approach—fog—inadequate ground lights

Further, the Task Force's recommendation to establish a single set of regulations applicable to large airplanes in noncommon carriage operations is validated by changes in operational concepts which occurred subsequent to the Airline Deregulation Act of 1978. That Act substantially relaxes the statutory economic restrictions on air carrier certification and route authority which existed for many years. It encourages competition in the marketplace. One result is that there is now incentive for persons such as commercial operators to enter common carriage operations as air carriers. FAA records show that four commercial operators of large airplanes have become air carriers since the October 1978 effective date of that Act.

Air travel clubs operate large, airline-type airplanes and, as a group, they have experienced significant changes in the short period of time between the issuance of Notice 79–19 and the issuance of this final rule. There were 11 air travel clubs in November 1979 and on May 20, 1980, there were only 7. This reduction implies that the need for air travel clubs, as traditionally constituted, is diminishing in today's environment. The FAA's regulatory program, as revised by Part 125, provides meaningful alternatives for travel clubs. They may seek common carrier certification under Part 121 or, if they do not wish to become common carriers, they may operate under Part 125 which does not restrict the charges which may be made. Current Part 123 defines an "air travel club" as "a person who engages in the carriage by airplanes of persons who are required to qualify for that carriage by payment of an assessment, dues, membership fee, or other similar type of remittance." This limitation on compensation, of course, does not apply under Part 125. This is a substantial benefit to travel clubs. One travel club requests a short-term exemption to permit it to operate in the manner contemplated by Part 125 until the Part becomes effective. That club also states that if Part 125 is not adopted, it intends to seek CAB authority to operate as a supplemental carrier.

Similar revenue opportunities exist under Part 125 for corporate transport and aircraft lease and aviation service operators.

Role of Part 125 in FAA Enforcement Program

Part 125 is an integral part of the FAA's stepped-up enforcement program designed to reduce accidents and enhance compliance with the FAR. Part 125 is aimed primarily at operators who use subterfuges to avoid compliance with appropriate regulations. Part 125 will make it easier to detect these operators and take appropriate enforcement action. It also should serve to deter persons from attempting to evade the regulations because the risk of detection is increased. Other parts of this enforcement program include:

- Numerous large civil penalties collected from large air carriers, commuter/air taxi operators, and manufacturers in 1979.
- Proposed legislation to raise the maximum civil penalty for each FAR violation from $1,000 to $25,000 and to authorize the FAA to seek criminal penalties in flagrant cases.
- Issuance of a new enforcement handbook which consolidates all enforcement material into one source and contains many new provisions for guidance of FAA personnel.
- Agreement with the Department of Justice on a method to speed up processing of enforcement actions in the courts.
- Development of a computer-based system which will give agency personnel prompt access to an airmen's or an operator's compliance record.

Highlights of New Part 125

In this discussion of Part 125 some references are made to comments received, but detailed discussion of the comments are covered under the substantive provisions which appear under the discussion of comments.

Effective Date and Application Procedure

Part 125 is effective February 1, 1981. After that date, the owner/operator of an airplane subject to the rule is allowed 120 days to submit an application for certification. To provide for transition to the new rule, persons who file an application for a certificate and operations specifications to operate under Part 125 before expiration of the 120 days must continue to operate under the rules applicable to their operations on the day preceding the effective date of Part 125. These operations may continue until a certificate and operations specifications are issued or the application is denied. The application must consist of a letter containing the information required by § 125.21, a copy of the manuals required by Subparts C and G, and a copy of all contracts or agreements, if any, that have

been entered into for required services provided by other entities. The application should also include a copy of any grant of deviation issued to the applicant. The filing of an application means that the applicant has taken all steps necessary to comply with Part 125 and is ready for FAA inspection to determine compliance with Part 125 for issuance of a certificate and operations specifications. No person may engage in operations governed by this Part subsequent to 120 days after the effective date unless he/she holds a certificate and operations specifications issued by the FAA, has made application as described above, or holds deviation authority from all provisions of Part 125. Requirements for requesting deviation authority are contained in § 125.3. If an owner/operator desires a deviation from all or part of the rule, such request must be made in a timely manner so as to allow time for action on the request and thereafter to allow time to submit an application for certification during the 120-day period if all or part of the deviation request is denied. A person seeking deviation authority from one or several sections of Part 125 must submit all information that the applicant believes will justify the granting of a deviation.

Any person requesting a deviation authority from the entire Part 125 after the 120-day period must file the request at least 60 days prior to the date of intended operations and may not operate unless and until the deviation authority is granted or a certificate is issued.

SUBPART A—GENERAL

New Part 125 provides a single set of certification and operation rules for U.S.-registered airplanes which have a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more when used in any noncommon carriage operation. Ascertainment of the size of airplane to be covered under the new Part presented a difficult regulatory problem. As noted in the discussion under the heading "Background of this Rulemaking Proceeding," the DOT study included a recommendation that standards be developed that are appropriate to the operation of transport category airplanes engaged in noncommon carriage operations for inclusion in a single set of regulations. The range of airplanes varied from the relatively small DC-3 to the very large B-747. The FAA's best judgment in developing Notice 79-19 was that airplanes certificated to carry 20 or more passengers or a maximum payload of more than 5,000 pounds should be covered by Part 125. The payload capacity is raised from 5,000 to 6,000 pounds so that most airplanes used by business corporation flight departments are not subject to the new rules unnecessarily, since these operations have an excellent safety record.

An operating certificate and operations specifications are required. These are among the most important features of Part 125 because each person operating airplanes subject to the Part must undergo a certification process similar to that applied to air carriers. This process includes the issuance of operations specifications tailored to each operator's circumstances. The requirement is significant because it provides the FAA the opportunity to review and become familiar with a specific operation before flight begins. Thus, the upgrading of safety from Part 91 levels accomplished by this rule will be verified through the certification process which includes an indepth examination of every facet, including operations, airworthiness, and personnel competency, rather than an "after the fact" determination accomplished through routine surveillance. There is no comparable provision in Part 91. To facilitate FAA surveillance and inspection, a copy of the certificate and operations specification and/or any deviation authority must be carried in each airplane subject to Part 125.

Because Part 125 does not allow common carriage operations, a new § 125.11 is added to implement this basic concept. The holder of an Air Carrier Operating Certificate is ineligible for a Part 125 certificate. A Part 125 certificate holder is prohibited from conducting any operation which results directly or indirectly from any person's holding out to the public to furnish transportation. This will help to ensure that no subterfuges are utilized by contract or other means to feed common-carriage-generated transportation to Part 125 certification holders.

U.S.-registered airplanes of the specified size operated by foreign citizens are subject to Part 125. The entire Part applies if the airplane is operated anywhere within the United States. This includes operations where the airplane is flown only to a territory, possession, or a coastal city such as Key West or San Juan for a brief stop and is then flown out of the United States. This implements a basic premise of Part 125 that a uniform standard of safety should apply to all U.S.-registered airplanes of the specified size. When a foreign citizen operates a U.S.-registered airplane outside the United States, only § 125.247 applies. This establishes a basic level of airworthiness and should make it unattractive for foreign citizens to use U.S. registration as an "aviation flag of convenience," a situation the FAA has encountered, especially in operations conducted between the southern part of the United States and Central and South America. Foreign citizens operating U.S.-registered airplanes of the covered size may apply to any FAA Flight Standards district office for a special flight permit to allow operation to the United States for the purpose of obtaining Part 125 certification.

Deviation authority is included in response to comments which indicate the need for flexibility to permit adjustments based upon the circumstances of a particular operation. Notice 79-19 invited consideration of the need for that authority. Accordingly, Part 125 provides that the Associate Administrator for Aviation Standards may grant deviation authority from one or more sections depending upon the circumstances and justification presented. Although it is difficult to foresee more than a few situations in which a deviation from the entire Part could be justified, it is possible. Some examples are an airplane museum operation, a parachute jumping operation, or a corporate flight department operating an airline-type airplane for carriage of company executives.

Commercial operators and air travel clubs presently conduct operations under Part 121 or 123, respectively, and may require time for transition to Part 125. They are permitted to continue their operation under Part 121 or 123, respectively, and are not required to comply with Part 125 until January 1, 1983, if they should hold a certificate on the effective date of this Part. They may, however, make application for certification under Part 125 at any time. No new applications for certification under Part 123 will be accepted after the effective date of Part 125. No new applications for certification under the commercial operator rules of Part 121 will be accepted after the effective date of Part 125 except for persons who want to engage solely in intrastate common carriage under Part 121. These intrastate common carriage operators are not subject to the rules of Part 125. The deferred compliance date for air travel clubs is especially important in view of the significant changes which are occurring in those operations. Since the issuance of Notice 79-19, 4 of 11 clubs surrendered their operating certificates. Apparently these actions are a result of the dramatic changes occurring in the aviation industry.

SUBPART B—CERTIFICATION RULES AND MISCELLANEOUS REQUIREMENTS

This subpart contains the certificate and operations specifications concepts used to regulate air carriers in Parts 121 and 135. The applicant must demonstrate that it is properly and adequately equipped to conduct a safe operation in accordance with the requirements of Part 125 and the operations specifications. Specific grounds for denial of a certificate are established.

Other highlights of this subpart include:

- Each exit (other than an over-the-wing exit) that is more than 6 feet from the ground must have an approved means for assisting occupants in descending to the ground.
- At least 8 consecutive hours of rest in any 24 hours is required for each flight crewmember. The Administrator may specify other rest and duty time limitations in the operations specifications if required in the interest of safety. This is necessary to ensure against an unsafe level of fatigue. No comparable provisions are contained in Part 91.

- Each operator is required to have a system for locating flights for which an FAA flight plan is not filed. These requirements are similar to those for air carriers under Part 135 and are not contained in Part 91.
- There must be enough management personnel to ensure that operations comply with the requirements of Part 125. A director of operations is specifically required. These requirements are not contained in Part 91.

SUBPART C—MANUAL REQUIREMENTS

This subpart requires the certificate holder to establish a manual containing procedures acceptable to the Administrator which must be used by the certificate holder's flight, ground, and maintenance personnel. Some of the important subjects which must be included in the manual are:

- Procedures for ensuring compliance with weight and balance limitations.
- Provisions for ensuring that the pilot in command knows that required airworthiness inspections have been made and that the airplane has been properly approved for return to service.
- Mechanical irregularity reporting and procedures to ensure that the pilot in command determines that mechanical irregularities or defects from previous flights have been corrected or that correction has been properly deferred.
- Refueling procedures, including supervision and protection of passengers during the refueling.

The manual requirements in this subpart have worked satisfactorily in operations under Part 135 and are similar in many respects to those required under Part 121. No comparable provisions exist in Part 91.

SUBPART D—AIRPLANE REQUIREMENTS

This subpart requires airplanes under Part 125 to have appropriate airworthiness certificates and meet applicable airworthiness requirements. In recognition of the importance of accurate empty weight and center of gravity to safety of flight, no airplane may be operated unless the empty weight and center of gravity are calculated from values established by actually weighing the airplane within 36 calendar months preceding any operation. The only exception to this requirement is an airplane on which an original airworthiness certificate has been issued in the 36 months preceding operation. The original certification process ensures that airplane weight and center of gravity are accurately established.

SUBPART E—SPECIAL AIRWORTHINESS RULES

These rules establish minimum standards of airworthiness to ensure adequate protection against fires, suitable ventilation for passengers and crewmembers, and that all cargo is carried safely. They are the same as counterpart requirements which currently exist in Parts 121 and 123.

This subpart also requires satisfactory demonstration by the certificate holder of its ability to evacuate safely the full seating capacity of any airplane used in passenger-carrying operations with a seating capacity of more than 44 passengers. The requirement is similar to air carrier requirements.

Part 91 does not contain requirements similar to those contained in this subpart.

SUBPART F—INSTRUMENT AND EQUIPMENT REQUIREMENTS

This subpart establishes requirements to ensure that each airplane operated under Part 125 contains the instruments and equipment necessary for an adequate level of safety. Specific requirements include certain radio and navigation equipment, instrument flight equipment, emergency and overwater operations equipment, passenger seat, safety belt, and information requirements, rules for use of medical oxygen by passengers, and equipment for operations in icing conditions.

A very significant safety requirement is airborne weather radar similar to that prescribed for large air carriers under Part 121. This facilitates detection and avoidance of thunderstorms and related hazardous conditions such as turbulence.

A minimum equipment list provision is included which provides the operator a flexible procedure under which an airplane may be safely operated when certain instruments and equipment are not operable. The FAA is considering a proposal to amend Part 91 to include a minimum equipment list provision which will apply to all Parts of the FAR.

SUBPART G—MAINTENANCE

This subpart contains requirements which ensure that airplanes, airframes, aircraft engines, propellers, appliances, each item of survival and emergency equipment, and components are safely maintained and inspected. Many of the requirements are similar to maintenance rules now prescribed for air travel clubs. The substance of the air travel club rules is upgraded by an aircraft engine overhaul program which includes specific time intervals for performing certain work on the aircraft engines, including replacement of parts and components and accomplishment of overhauls. This feature should reduce accidents caused by engine failure or decreased performance as experienced under Part 91. This subpart also—

- Makes the certificate holder primarily responsible for airworthiness;
- Requires the certificate holder to have a maintenance manual containing procedures to be followed in performing inspections, including safeguards which ensure that work interruptions do not adversely affect required inspections, and to ensure that those inspections are properly completed before the airplane is released to service; and
- Prohibits a person from performing a required inspection if that person performed the item of work required to be inspected.

SUBPART H—AIRMAN AND CREWMEMBER REQUIREMENTS

Rules in this subpart ensure that airmen are appropriately certificated and that the composition of the flightcrew complies with the minimum required by the type certificate and the Airplane Flight Manual. On any airplane requiring a flight engineer, one of the other flight crewmembers must be qualified to provide emergency performance of the flight engineer's duties in case of illness or other incapacitation.

In recognition of the necessity for precise navigational capability, a flight navigator or approved long-range navigation equipment is required on any operation outside the 48 conterminous United States and the District of Columbia when the airplane's position cannot be reliably fixed for a period of more than 1 hour.

Since many of the airplanes operated under Part 125 will be large airline-type airplanes, flight attendant requirements are imposed which require at least one attendant on any airplane having more than 19 passengers. The required number of attendants increases as more passengers are carried. During takeoff and landing, required flight attendants must be located as close as practicable to required floor-level exits and must be uniformly distributed throughout the airplane. These requirements are imposed because time is of the essence when an emergency evacuation is necessary. The rule also assigns emergency functions to flight crewmembers and flight attendants and requires the certificate holder to show to the satisfaction of the Administrator that the functions can be practicably accomplished.

SUBPART I—FLIGHT CREWMEMBER REQUIREMENTS

This subpart is designed to ensure a properly qualified crew. Emphasis is placed on required tests and checks instead of the training program concept currently used in Parts 121 and 123. This regulatory philosophy permits a reduction from the requirements in Parts 121 and 123, but provides a satisfactory level of safety under Part 125 which covers

a wide range of operations formerly covered under Parts 91, 121, and 123. Again, it should be noted that the DOT Task Force recommended elimination of commercial operator and air travel club rules through establishment of a single set of regulations covering non-air carrier operations.

Specific requirements in this subpart include—

- A pilot in command (PIC) must have at least a commercial pilot certificate, an appropriate category, class, and type rating and instrument rating, and at least 1,200 hours pilot time, including 500 hours cross-country time, 100 hours night time, at least 10 night takeoffs and landings, and at least 75 hours of actual or simulated instrument flight of which at least 50 hours were in actual flight;
- Three takeoffs and landings within the 90 days preceding serving as a pilot;
- Detailed initial and recurrent pilot testing requirements covering a wide range of subjects and procedures;
- Detailed initial and recurrent flight attendant testing requirements; and
- Prohibition on use by any pilot of any type of instrument approach procedure unless the pilot has satisfactorily demonstrated that type procedure within the preceding 6 months and has received a letter of competency.

Airplane simulators approved by the Administrator may be used in checks required by this subpart. This will result in fuel and other cost savings for the operator.

SUBPART J—FLIGHT OPERATIONS

Various operational rules are included in this subpart to ensure safe operation. They include—

- Requirements for pilots to remain at their duty stations except in limited circumstances;
- Prohibition of unauthorized manipulation of the flight controls;
- Restrictions on admission of persons to the flight deck;
- Requirement for the pilot in command to enter all mechnical irregularities in the maintenance log at the next point of landing after the irregularity comes to the pilot's attention;
- Prohibition on making an instrument approach unless the type of instrument approach procedure to be used is listed in the certificate holder's operations specifications; and
- Minimum altitudes permitted for use of the autopilot.

SUBPART K—FLIGHT RELEASE RULES

This subpart prescribes detailed requirements for a flight release system. These are based upon Parts 121 and 123 and represent a significant upgrade from Part 91. They ensure that the necessary preflight steps are taken to ensure a safe flight.

The subpart includes—

- A prohibition on starting a flight unless authorized by the person having operational control authority;
- A requirement for the pilot in command to obtain all additional available information inflight about meteorological conditions and irregularities of facilities and services that may affect the safety of flight;
- A prohibition on release for flight unless required communication and navigation facilities are operating;
- A requirement that a flight cannot be released for IFR or over-the-top flight unless the weather at the time of arrival is forecast to be at or above authorized minimums;
- Alternate airport requirements;

- Safe fuel reserve requirements for piston engine and turbine-powered airplanes;
- Increased landing minimum requirements for a pilot in command who does not have at least 100 hours in operations in the type of airplane being operated; and
- A requirement for completion of a load manifest for each flight, containing detailed information on the load and the center of gravity.

SUBPART L—RECORDS AND REPORTS

These requirements are based on those in Parts 121, 123, and 135 and include crewmember qualification records, form of flight release, retention and disposition of flight releases, load manifests, flight plans, use of an airplane maintenance log, and reports of defects or unairworthy conditions. An airworthiness release or entry in the aircraft maintenance records is required before an airplane may be operated after maintenance, preventive maintenance, or alteration work is performed.

These rules represent a significant upgrade from Part 91 but do not include the extensive reporting requirements of Part 121. This is consistent with the DOT Task Force recommendation.

Cost Impact Analysis of Part 125

A. Availability of Impact Report.

In keeping with the agency's policy of making a comprehensive analysis of cost impacts of proposed regulations, the FAA contracted with the Aerospace Corporation to estimate the expected costs that would be incurred by the industry should proposed Part 125 be adopted.

The Aerospace Corporation prepared a report dated January 31, 1979, which sets forth an industry cost impact assessment of Part 125 as it was originally planned. After that report was prepared, certain additional regulatory proposals were developed for which separate industry cost impacts were assessed. An economic impact assessment covering all regulatory changes in the final rule is available in the FAA Rules Docket for examination by interested persons.

B. Summary of Report.

In conducting the initial industry cost assessment, a data base was developed that identified those specific airplanes and operators that could be affected, along with the nature of the cost impact. The total population was divided into a number of categories with similar cost impacts. Representative data and actual anticipated costs were gathered and extrapolated to the total population for these categories for each of the proposed rule changes incorporated in Part 125. For subsequent changes, estimates were developed of the number of specific airplanes that would be subject to a cost impact and representative cost factors were applied to the identified population to determine the likely industry cost impact.

As shown in Tables 1 and 2, the analyses resulted in an estimated initial cost to the industry of $67.83 million and a recurring annual net cost of $20.45 million, for a total first-year cost of $88.28 million. This cost represents an increase of $6.44 million over the total first-year cost estimated at the time Notice 79–19 was prepared. This is due to the increase in costs to overhaul jet engines on affected aircraft. The rules that would produce the largest industry cost impacts include "Certification Rules and Miscellaneous Requirements" (Subpart B), "Manual Requirements" (Subpart C), "Instrument and Equipment Requirements" (Subpart F), "Maintenance and Inspections" (Subpart G), and "Flight Crewmember Requirements" (Subpart I), with Subpart G producing the greatest cost impact. These rules would mandate obtaining on operating certificate, the preparation of operations specifications and manuals, weather radar equipment, scheduled engine overhauls, limited flightcrew duty time, and certain recurrent testing of flight crewmembers.

As indicated by reference to Table 2, the category of operator that would be most affected would be the 275 aircraft leasing companies and aviation service firms with $61.76 million of initial cost and $15.69 million in annual recurring costs. The 258 corporate transport operators would be the next most impacted, with $4.49 million of initial cost and $4.27 million in annual recurring costs. The cost estimates in Tables 1 and 2

are conservative, and will be overstated to the extent that deviation authority is granted. Air travel clubs will have increased annual revenues as a result of the new rules lifting the prohibition of operation for compensation or hire when common carriage is not involved. This annual increase of $1.35 million for the seven active air travel clubs would be the net gain over the costs estimated for compliance with the remaining rule changes. Revenue gains are also possible for corporate transport and aircraft lease-aviation service firm operators, but these benefits are not reflected in these industry impact estimates because there is no reliable method for estimating the number of operators who will avail themselves of this opportunity.

Table 1.—*Part 125 Cost Impact (Initial and Recurring),[1] by Subpart*

[In millions of dollars]

Subpart	Title	Operator category			
		Corporate transport	Lease-service firms	Travel clubs	Total[2]
A	General	0	0	0	0
		0	0	[3](1.35)	(1.35)
B	Certification	2.51	3.36	.01	5.88
	Rules	2.04	8.83	.02	10.89
C	Manual	.09	2.25	0	2.34
	Requirements	.51	.69	.01	1.21
D	Airplane	.57	1.26	.02	1.85
	Requirements	.19	.37	.01	.57
E	Airworthiness	0	.24	0	.24
	Requirements	0	0	0	0
F	Equipment	.98	1.87	0	2.85
	Requirements	0	.21	0	.21
G	Maintenance and	.06	52.71	0	52.77
	inspection	.01	.78	.01	.80
H	Navigator	.25	0	0	.25
	Requirements	.04	0	[4](.1)	(.06)
I	Pilot	.03	.02	0	.05
	Qualifications	.83	2.46	0	3.29
J	Flight	0	0	0	0
	Operations	0	.02	0	.02
K	Flight	0	0	0	0
	Release	.15	1.78	0	1.93
L	Records and	0	.05	0	.05
	Reports	.50	.55	0	1.05
Total	All	4.49	61.76	.03	66.28
		4.27	15.69	[3](1.40)	18.56

[1] Upper number is initial cost, lower number is annual recurring cost.
[2] Does not include unallocated cost attributable to airplanes for which registration status was in transition.
[3] Added revenue, shown as cost savings, less increased premiums of insurance for aircraft hull and seat liability.
[4] Cost savings due to deletion of part 123 training requirements.

Table 2.—*Part 125 Initial, Recurring and Total Cost Impact, by Airplane Type*

[In millions of dollars]

Airplane type	Type cost[1]		Operator category			
			Corporate transport	Lease-service firms	Travel clubs	Total
Piston	I	=	3.33	32.44	0.01	35.78
	R	=	2.63	12.54	0	15.17
Turboprop	I	=	.88	5.20	0	6.08
	R	=	.76	2.05	0	2.81
Turbojet	I	=	.28	24.12	.02	24.42
	R	=	.88	1.10	.04	2.02
Total all airplanes	I	=	4.49	61.76	.03	66.28
	R	=	4.27	15.69	[2](1.40)	18.56
	C	=	8.76	77.45	(1.37)	84.84
Total first year cost, unadjusted						
Total industry cost[3]	I	=	.....	.....	.....	67.83
	R	=	.....	.....	.....	20.45
	C	=	.....	.....	.....	88.28

[1] I = Initial Cost; R = Annual Recurring Cost beginning with effective date for compliance; C = Total First Year Cost (I + R)
[2] Net Revenue Gain of $1.40 million. Airplane mix precludes engine type breakout.
[3] Includes unallocated costs attributable to airplanes for which registration status is in transition.

C. Discussion.

In analyzing the economic consequences of Notice 79-19, the magnitude of the economic impacts on the national economy and on various general factors were addressed. However, primary emphasis was placed on quantifying the cost impact on the segments of the aviation industry most affected by the proposed rules. For this purpose types of costs and categories of parties impacted were analyzed for each of the relevant subpart paragraphs.

1. *Impact on Industry*

In conducting the industry cost impact analysis, the FAA commissioned an independent assessment of the cost impacts likely to result from the proposed rule changes. This assessment was conducted by the Aerospace Corporation during December 1978 and January 1979, and reflects data available at that time. Information on the structure, conduct, and results of this cost impact assessment, along with discussions of data limitations, are provided. Full documentation of the study and its associated data bases are provided in the report, "Industry Cost Impact Assessment of Proposed Part 125," January 31, 1979, The Aerospace Corporation, which is in the docket.

After that report was prepared, certain additional regulatory proposals were developed for which separate cost impacts were assessed. This study presents information on the analytical methods employed and the results obtained from conducting the additional cost assessment and in integrating the results with those from the initial industry cost assessment.

2. *Outline of Initial Industry Study*

The cost impact assessment was structured to include the following major elements for the changes listed in the Part 125 proposals:

- Identification, classification, and characterization of potential cost impact areas through a detailed analysis of the rule changes that were planned to be proposed in Notice 79-19 and by comparison with the existing Part 91 and Part 123 provisions in light of known industry practices and procedures.
- Development of a classification system for operators of airplanes certificated for 20 or more passengers or a maximum payload of 5,000 pounds or more. This system was designed to differentiate the varying levels and types of cost impacts of the proposed changes across the diverse elements of the industry likely to be affected.
- Identification and classification of the population of airplanes and operators potentially impacted by the proposed rule changes to differentiate cost impact elements.
- Development and implementation of an optimal allocation method for choosing a scientific sample of operators with reasonable assurance of achieving high statistical significance of the results.
- Collection, processing, and analysis of impact estimates to produce assessments of cost impacts on the industry and its constituent parts for individual and aggregated proposed changes compiled under Part 125.

3. *Identification of Part 125 Changes*

To begin the initial industry cost impact assessment process, it was necessary to develop an indepth analysis of the planned Part 125 and the changes from the existing rules under Parts 91, 121, and 123. For this purpose, a matrix was prepared to:

- Summarize each subpart of the planned Part 125;
- Identifying specific changes to existing Parts 91, 121, and 123 that would be incorporated in the planned new Part 125;
- Assess the potential for cost impacts to the affected population according to type of propulsion of airplanes, type of operator, and type and magnitude of cost impact;
- Define the specific data required to identify, categorize, and quantify the potential operator cost impacts.

To assure that all planned provisions resulting in industry cost impacts were properly identified and interpreted, the draft matrix was reviewed by FAA experts in the Office of the Associate Administrator for Aviation Standards and the Office of Aviation Policy.

As a result of this analysis and review process, 20 specific planned Part 125 provisions were identified that were likely to impose cost impacts. These provisions are listed in Table 3. (Two additional items are listed which were the subject of the supplemental analysis.) Preliminary analysis indicated that industry cost impacts for these 20 provisions could be differentiated into the following categories according to the type of cost that would be incurred by the affected Parts 91, 121, and 123 operators:

- Initial cost (the one-time charge for purchase and installation of equipment, for preparation of manuals, etc.).

Table 3.—*Part 125 Paragraphs With Industry Cost Impacts*

Subpart	Para.	Title
A	125.1	APPLICABILITY
B	125.25	MANAGEMENT PERSONNEL REQUIRED
	125.31	CONTENTS OF CERTAIN CERTIFICATION & OPERATIONS SPECIFICATIONS
	125.39	DUTY TIME LIMITATIONS
C	125.71	PREPARATION
D	125.91*	AIRPLANE REQUIREMENTS
	125.93	AIRPLANE LIMITATIONS
E	125.119	FIRE PRECAUTIONS
F	125.207	EMERGENCY EQUIPMENT REQUIREMENTS
	125.221	ICING CONDITIONS: OPERATING LIMITATION
	125.223	AIRBORNE WEATHER RADAR EQUIPMENT REQUIREMENTS
G	125.247*	INSPECTION PROGRAMS
	125.249	MAINTENANCE MANUAL REQUIREMENTS
	125.251	REQUIRED INSPECTION PERSONNEL
H	125.265	FLIGHT NAVIGATOR & SPECIALIZED NAVIGATION EQUIPMENT
I	125.281	PILOT IN COMMAND QUALIFICATIONS
	125.283	SECOND IN COMMAND QUALIFICATIONS
	125.287	INITIAL AND RECURRENT PILOT TESTING REQUIREMENTS
	125.291	PILOT IN COMMAND: INSTRUMENT PROFICIENCY CHECK REQUIREMENTS
J	125.323	REPORTING MECHANICAL IRREGULARITIES
K	125.351-125.383	FLIGHT RELEASE RECORDS
L	125.401-125.411	RECORDS AND REPORTS

* Cost impacts covered in supplemental analysis.

- Annual recurring cost (continuing costs to maintain additional equipment, for upkeep of manuals, for continuing proficiency checks, for salaries of personnel, etc.), including annual revenue loss or gain.

4. *Industry Characterization*

In parallel with the cost impact identification activity, a major effort was undertaken to acquire the data base needed to identify and characterize the Parts 91, 121, and 123 operators and divide them into more definitive subcategories for analytical purposes. The FAA "Aircraft Registration Master File," as of September 30, 1978, was used as the basis for identifying the population of Part 91 airplanes and their associated operators that might be impacted. This computerized data file is compiled from the current registration files on all U.S. civil aircraft. The registration files are maintained by the Data Services Division at the FAA Aeronautical Center in Oklahoma City, Oklahoma. Data on Part 121

commercial operators and on the total population of 11 active Part 123 operators were provided separately by the office of the Associate Administrator for Aviation Standards.

In the case of Part 91 operators, a total of 2,263 airplanes were identified as meeting the criteria of general aviation "airplanes certificated to carry 20 or more passengers" after the specific deletions were made to conform to the exclusions provided in § 125.1(c). (The data base does not contain values for "maximum payload capacity," so that a large number of small jet turbine-powered airplanes capable of payloads in excess of 5,000 pounds were not included in this count.) Of these airplanes, 2,057 were owned by a total of 942 different individuals or entities and 206 airplanes were listed in the registration files as "sale reported" or "registration pending" indicating that registration status was in transition.

The potentially affected airplanes of Part 91 operators were categorized according to their type of propulsion and the nature of their ownership characteristics. The propulsion categories used were piston (reciprocating), turboprop, and turbojet. The operators were segmented into the categories of corporate transport, aircraft lease and aviation service firms, certificated commercial operators (Parts 121 and 135), a miscellaneous category encompassing museums, exhibition, educational and other similar owners, aircraft manufacturers, Federal government, and state and local governments. These categories were determined to group airplanes and owners which could be expected to exhibit similar cost impacts under the planned Part 125, taken as a whole. Results of the categorization are shown in Table 4.

5. *Statistical Study Design*

A stratified sampling technique was designed in accordance with the categories described above to assure a representative cross-section of the industry. A total of 18 strata were used for the sampling allocation: 6 operator categories with 3 engine types per category. Three other categories of operators were identified but not included in the sampling allocation. These were air travel clubs for whom data on all 11 operators were obtained, aircraft manufacturers for whom data on all 3 operators were obtained, and the 2 unknown operator categories of identified aircraft. The unknown operator category has a population of 206 aircraft, or about 9 percent of the total industry population. For analysis purposes, the cost impact to this group was assumed to be proportional to its representation by airplane type in the total industry population. Actual allocation of the samples was chosen to yield a minimum variance estimate of the overall industry impact.

Table 4.—*PART 125, Airplane Population Data Base*
(As of September 30, 1978)

General Aviation Airplanes	Piston	Turbo-prop	Turbo-jet	Total
Corporate Transport	217	66	43	326
Aircraft Lease & Aviation Service Firms	1,003	108	193	1,304
Certificated Commercial Operators	10	41	124	175
Museums, Exhibition, Education, Misc.	87	13	0	100
Aircraft Manufacturers	0	0	16	16
Federal Government	76	17	13	106
State & Local Government	28	2	0	30
Sale Reported	169	5	15	189
Registration Pending	17	0	0	17
Subtotal	1,607	252	404	2,263
Air Travel Clubs				
Part 123 Operators	3	2	12	17
Total	1,610	254	416	2,280

Stratified sampling requires nonoverlapping subpopulations in each matrix cell. Since some operators own airplanes of more than one engine type, the sampling was done on an airplane basis rather than an operator basis. Random sampling by airplane type within a cell also has the benefit that operators with large fleets have a greater chance of being sampled. In effect, fleets of different sizes tend to be sampled in proportion to their fraction of the total airplane population. The resulting sampled distribution then resembles that from a population stratified by fleet size, even though the explicit sample allocation was based on only the two explicit stratification factors of operator category and engine type. Within each stratum, strictly random sampling was used.

In the analysis, the stratum variances were estimated judgmentally in order optimally to allocate the samples. Because these estimates proved to be valid, the stratified sampling technique was more accurate than totally random sampling. First the sample was divided between the corporate transport and lease-service categories versus the other four categories. It was assumed the variances on each side were equal, so the samples were split directly according to population. Thus, 80 percent of the samples were assigned to the combined corporate and leasing categories, while the remaining 20 percent went to the other four categories. These 20 percent were further divided strictly by population into the 12 strata of the four categories.

As the data acquisition and analysis proceeded, it was determined that operators of a significant unknown fraction of airplanes in the data base would not incur any costs because they did not currently operate under the Part 91 (Subpart D) provisions planned to be covered by the new Part 125. For example, the data base included inactive and public use airplanes as well as airplanes currently and prospectively operated under Part 121, 135, or 137, even though registered as general aviation airplanes. Because these aircraft would continue to be operated in their respective status, no cost impact would result from the Part 125 proposal. Tables 5 and 6 present estimates of those airplanes with confirmed cost impacts according to the stratification described above, along with information on the number of associated operators. This same data base was used for the supplemental analysis of the two additional proposed Part 125 rules regarding weighing of airplanes and engine overhauls. It was considered to be suitable, also, even after the maximum payload capacity was raised from 5,000 pounds to 6,000 pounds under Part 125 because payload capacity was not used as criterion when the data base was established.

Since the new unknown population factor was equal for each of the strata, the optimal sample allocation for the combined uncertainties shifted toward the equal variance case and this adjustment was made without requiring additional sample selection. This condition was due to the small size of the adjustment: four samples moved from the lease operator-piston stratum to the corporate category. If more samples had been required, the minimum variance strategy could again be updated using the present data to estimate the stratum populations and variances. As it stands, the estimated standard deviations proved to be very close to the data actually obtained.

6. *Estimated Cost Impacts*

Individual estimates were made for each of the sample strata for both initial and annual recurring costs. The product of the population and the cost per airplane then yields a total cost impact for each stratum, and a sum over all the strata gives the estimated total industry impact. For each stratum, the affected population was estimated as the data base population of the cell multiplied by the fraction of samples in that cell which would be affected by the Part 125 rules.

It was found that certain operator categories, namely Federal, state and local governments, and certificated commercial operators, would not experience a cost impact under the new regulations since all these operators are excepted or complying with more stringent FAR Parts. On the other hand, the sample indicated that all of the airplanes in the corporate and miscellaneous categories would be affected. For the most populated "lease and service firm" category, about half of the operators in the data base would be affected.

Table 5.—*Airplanes and Operators With Cost Impacts Attributable to Planned Part 125*

(As of September 30, 1978)

	Piston		Turboprop		Turbojet		Total	
	#Air-planes	#Opers.	#Air-planes	#Opers.	#Air-planes	#Opers.	#Air-planes	#Opers.[1]
Corporate Transport	217	181	66	50	43	39	326	258
Aircraft Lease & Service Firms	554	257	43	24	38	11	635	275
Museums, Exhibition, Education, Misc.	87	46	13	4	0	0	100	48
Aircraft Manufacturers	0	0	0	0	16	3	16	3
Air Travel Clubs [2]	0	0	3	3	10	5	13	7
Unknown Operators [3]	97	—	3	—	8	—	108	—
Total	955		128		115		1,198	

[1] The total data reflects the absolute number of operators even though the same operator may be included in more than one airplane type.

[2] Data as of May 1980.

[3] Identified airplanes listed as "sale reported" or "registration pending" on FAA Aircraft Registration Master File, adjusted for proportional representation of impacted airplanes in total data base.

Table 6.—*Estimated Operators and Airplanes Per Operator [1] With Cost Impacts From Planned Part 125*

(As of September 30, 1978)

	Piston		Turboprop		Turbojet		Total	
	#Oper.	AC./Oper.	#Oper.	AC./Oper.	#Oper.	AC./Oper.	#Oper. [2]	AC./Oper.
Corporate Transport	181	1.2	50	1.3	39	1.1	258	1.3
Aircraft Lease & Service Firms	257	2.2	24	1.8	11	3.5	275	2.3
Museums, Exhibition, Education, Misc.	46	1.9	4	3.3	0	0	48	2.1
Aircraft Manufacturers	0	0	0	0	3	5.3	3	5.3
Air Travel Clubs [3]	0	0	3	1.0	5	2.0	7	1.9

[1] Does not include 108 identified airplanes with unknown operators where registration was in transition.

[2] The total data reflects the absolute number of operators even though the same operator may be included in more than one airplane category.

[3] Data as of May 1980.

For the affected operators of all categories, several different types of costs were assessed. An estimate was made of the approximate cost impact of each proposed subpart paragraph of the proposed new Part 125.

These estimates were for both initial and recurring cost and were assessed as either an operator cost or an airplane specific cost. An operator cost is one remaining nearly constant regardless of the number of aircraft owned; for example, the cost of obtaining an operating certificate or preparing an operations manual. An airplane cost is one which is directly dependent on the number of airplanes, such as added equipment on each airplane. Mean values were determined for the operator and airplane costs in each stratum.

Usually, total cost in a cell would be the mean airplane cost multiplied by the number of airplanes plus the mean operator cost multiplied by the number of operators. This was not the case because the operator subpopulations are not disjoint (that is, some operators owned airplanes of all three engine types). As an alternative, the operator, data were prorated into airplane data by finding the ratio of airplane operators for each

category and dividing the operator costs (of that category) by that ratio. The implicit assumption made in this method is that the ratio is the same for different engine types in the same category; the data base verified that this was approximately true. The total cost within a cell is then equal to the airplane cost plus the prorated operater cost times the number of airplanes. This method allows initial and recurring costs for each subpart in each cell to be consistently combined between cells to yield totals by category and engine type.

7. *Initial Industry Cost Impact Summary*

The extrapolated industry costs estimated to result from the planned Part 125 rules are summarized in Table 7. The information is presented in the table in the same operator categories and airplane type stratification used in the statistical sampling program. For each stratified category, both initial and annually recurring mean costs are indicated along with appropriate totals. A total first year mean cost is also shown that represents the sum of the initial cost and the recurring cost for this first year.

The total industry cost of the planned Part 125 rule changes was computed to be $16.09 million initial cost and $19.24 million in annual recurring costs. This resulted in an expected first year cost of $35.33 million.

The costs that would have been incurred by the industry for individual subparts of the planned Part 125 are summarized in Table 8. Subparts B, C, F, G, and I would have produced the most significant industry cost impacts. These impacts would have been principally due to flight and duty time limits, the documentation and coordination associated with obtaining an operating certificate, the development of operations specifications and manuals, and documentation of an approved airworthiness inspection program. The next major cost element would have involved weather radar requirements, pilot recurrent testing requirements, and semiannual instrument proficiency checks.

8. *Supplementary Cost Impact Analysis*

After the initial analysis was completed, two additional Part 125 provisions were introduced. These provisions were § 125.247 relating to engine maintenance and § 125.91

Table 7.—*Planned Part 125 Initial Industry Cost Impact Summary*
($ millions)

Airplane Type	Type Cost [1]		Operator Category: Corporate Transport	Lease-Service Firms	Museum Educ. Misc.	Aircraft Manuf.	Travel Clubs	Total
Piston	I	=	2.95	7.99	0.84	0.0	—	11.78
	R	=	2.50	12.22	0.08	0.0	—	14.80
Turboprop	I	=	0.74	0.23	0.08	0.0	—	1.05
	R	=	0.73	2.01	0.0	0.0	—	2.74
Turbojet	I	=	0.23	0.85	0.0	0.72	—	1.80
	R	=	0.86	1.09	0.0	0.46	–	2.41
All Airplanes	I	=	3.92	9.07	0.92	0.72	0.0	14.63
	R	=	4.09	15.32	0.08	0.46	(2.46) [2]	17.49
Total First Year Cost	C	=	8.01	24.39	1.00	1.18	(2.46)	32.12
Total Industry Cost [3]	I	=						16.09
	R	=						19.24
	C	=						35.33

[1] I = Initial Cost; R = Annual Recurring Cost; C = Total First Year Cost (I + R).

[2] Revenue Gain. Airplane mix precludes engine type breakout.

[3] Includes 10 percent increase to account for airplanes in process of registration.

Table 8.—*Planned Part 125 Cost Impact by Subpart* [1]
($ millions) [2]

Subpart	Title	Operator Category					
		Corporate Transport	Lease-Service Firms	Museum Educ. Misc.	Aircraft Manuf.	Air Travel Clubs	Total [3]
A	General	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.0	(2.41) [4]	(2.41)
B	Certification	2.51	3.36	0.08	0.32	0.01	6.29
	Rules	2.04	8.83	0.0	0.02	0.02	10.91
C	Manual	0.09	2.25	0.0	0.20	0.0	2.54
	Requirements	0.51	0.09	0.0	0.0	0.01	1.21
D	Airplane	0.0	0.15	0.0	0.0	0.0	0.15
	Requirements	0.0	0.0	0.0	0.0	0.0	0.0
E	Airworthiness	0.0	0.24	0.03	0.0	0.0	0.27
	Requirements	0.0	0.0	0.0	0.0	0.0	0.0
F	Equipment	0.98	1.87	0.81	0.0	0.0	3.66
	Requirements	0.0	0.21	0.08	0.0	0.0	0.29
G	Maintenance	0.06	1.13	0.0	0.20	0.0	1.39
	and Inspection	0.01	0.78	0.0	0.0	0.01	0.80
H	Navigator	0.25	0.0	0.0	0.0	0.0	0.25
	Requirements	0.04	0.0	0.0	0.0	(0.1) [5]	0.05
I	Pilot	0.03	0.02	0.0	0.0	0.0	0.05
	Qualification	0.83	2.46	0.0	0.29	0.0	3.58
J	Flight	0.0	0.0	0.0	0.0	0.0	0.0
	Operations	0.0	0.02	0.0	0.0	0.0	0.02
K	Flight	0.0	0.0	0.0	0.0	0.0	0.0
	Release	0.15	1.78	0.0	0.10	0.0	2.03
L	Records and	0.0	0.05	0.0	0.0	0.0	0.05
	Reports	0.50	0.55	0.0	0.05	0.0	1.10

[1] These estimates do not include costs for complying with engine overhaul and aircraft weighing requirements.
[2] Upper Number is Initial Cost, Lower Number is Annual Recurring Cost.
[3] Does not include unallocated cost attributable to airplanes where registration status was in transition.
[4] Added revenue, shown as cost savings.
[5] Cost savings due to deletion of Part 123 training requirements.

requiring weighing of airplanes. Cost estimates for these two provisions were developed by determining the number and type of specific airplanes that would be impacted and applying representative cost factors to the identified population.

In the case of weighing of airplanes, the total population of airplanes identified in Table 5 would have had cost impacts under the NPRM. These 1,198 airplanes were all subject to Part 125 (as proposed in the NPRM) and no exclusions were provided by type of airplane or category of use. A survey of industry sources yielded a representative compliance cost of $1,750 per airplane, including associated documentation costs. For the purposes of this analysis, the 16 turbojet airplanes operated by airplane manufacturers were excluded on the assumption that they would already be complying with this requirement during normal use. Factual information regarding operation of these 16 airplanes was not readily available during the analysis. Accordingly, this assumption was permitted to stand, recognizing that the maximum possible error related to that assumption was $28,000. Initial costs were calculated by multiplying the population of each airplane type per operator category by this cost factor. The results of these calculations are presented in Table 9. In fact, these figures are overstated for the final rule: not only may exclusions and deviation authority be allowed which will reduce the number of airplanes subject to the rule, but the requirement was relaxed to permit use of weights measured over the 3 years preceding the effective date of the rule.

For engine overhaul costs associated with § 125.247, the population identified in Table 5 was again determined to have potential impacts. In this case it was assumed, based on a survey of operators, that only the least-service firm category would have an additional cost impact. The other categories of operators were found to be following the engine manufacturers' recommended overhaul schedules, or it was found that their affected airplanes were not yet due for a scheduled overhaul. For the aviation lease-service firm category, the proportion of airplanes of unidentified operators was allocated, and a breakout between two engine and four-engine classes based on the distribution observed in the sample operators was made. In addition, a downward adjustment factor of 25 percent was applied to account for the airplanes in this category that are already

Table 9.—*Estimated Cost of Part 125 Airplane Weighing Requirement*

($ millions)

	Operator Category					
Airplane Type	Corporate Transport	Lease-Service Firm	Museum Educ. Misc.	Aircraft Manuf.	Travel Clubs	Total
Piston	0.38	0.97	0.15	—0—	0.01	1.51
Turboprop	0.12	0.08	0.02	—0—	—0—	0.22
Turbojet	0.08	0.07	—0—	—0—	0.02	0.17
Total First Year Cost	0.58	1.12	0.17	—0—	0.03	1.90

maintained to the required schedule, may be granted schedule extensions, or are otherwise not yet due for overhaul. Cost factors for each type of engine, derived from a survey of industry sources, were as follows: Piston—$20,000; Turboprop—$50,000; Turbojet—$150,000. Research for this study (prior to publication of the final rule) revealed that the only impact of inflation (over the year since the original study) was an increase of 33 percent for turbojet engines, to $200,000. The other two had not changed. The calculation of cost impacts at the time of this study are set out in Table 10.

9. *Total Cost Impacts*

Cost impacts from the initial industry assessment were combined with those from the two supplemental assessments according to each of the airplane type/operator category combinations. Subsequent to receipt of comments on the NPRM, some final adjustments were made. The composite, updated cost impacts showing initial and recurring cost details are provided in Tables 1 and 2 in Section B, Summary of Report.

Five final comments regarding total cost impacts are warranted here.

(a) There will be a significant, immediate cost to 275 aircraft lease and service firms amounting to an estimated $77.45 million the first year and $15.69 million each year after the first. Approximately 67 percent of the cost ($51.58 million) will be due to overhauling engines to meet more stringent requirements in Part 125 that do not exist in Subpart D of Part 91.

(b) Persons certificated under Part 121 for commercial operations (private carriage) using affected airplanes are not required but are expected immediately to obtain certification under Part 125 because of cost savings resulting from changed crew training and airplane maintenance requirements.

(c) There will be a large (up to 40 percent) increase in premiums for insurance for the seven air travel clubs currently certificated under Part 123. This increase amounts to an estimated $140,000 each year, in addition to a current total hull and seat liability premium cost of approximately $350,000 per year. This increase in premiums results from the sharing of actuarial statistics with all operations to be certificated under Part 125. No bodily injury claim has been filed in 16 years for operations conducted by an air travel club

Table 10.—*Estimated Industry Cost Impacts of Engine Overhaul Requirements, Part 125*

	No. Lease-Service Firm Airplanes	No. Airplanes Impacted	Impacted Airplanes with 2 Engines	Impacted Aircraft with 4 Engines	Total No. of Engines Impacted	$/Engine Cost Factor	Cost Impact ($ million)
Piston	616	462	337	125	1,174	$ 20,000	$23.48
Turboprop	44	33	17	16	98	$ 50,000	$ 4.90
Turbojet	39	29	—0—	29	116	$200,000	$23.20
Total	699	524	354	170	1,388		$51.58

[1] Includes proportional allocation of identified airplanes with unknown operators.

[2] Reduction factor of 25 percent to account for non-impacted airplanes.

[3] Based on distribution observed in sampled operators of initital study.

under Part 123. These clubs will now be operating under different regulations with a much larger group of operators, some of whom have had a much poorer safety record In combination with other factors, this could result in a significant loss of the market now served by the air travel clubs, and could result in their disappearance from the market.

(d) To the extent that deviation authority is granted, the economic impact on individual operators and industry segments will be reduced.

(e) By requiring all commercial operators to be certificated under Part 125, legitimate certificate holders can expect to recover at least some of the market lost to operators now operating illegally for "compensation or hire" under Part 91. The degree to which there is successful enforcement of the regulation will determine how much of the market is recovered.

Discussion of Comments and Revisions of Sections

Many sections proposed in Notice 79–19 were not the subject of substantive comments and contain no substantive changes from the proposal and, therefore, are not included in the discussion that follows. These sections are:

§§ 125.21, 125.23, 125.27, 125.33, 125.41, 125.43, 125.47, 125.51, 125.53, 125.111 through 125.187, 125.201, 125.203, 125.205, 125.211, 125.213, 125.217, 125.261, 125.265, 125.271, 125.283, 125.289, 125.295, 125.319, 125.321, 125.323, 125.329, 125.331, 125.351, 125.353, 125.355, 125.357, 125.361, 125.363, 125.367, 125.369, 125.373, 125.375, and 125.377.

PART 43

§ 43.15 Additional performance rules for inspections.

Notice 79–19 proposed amending this section by substituting the words "Part 125" for "Part 123" in § 43.15(a).

Since time to make the change from the provisions of Part 123 to those of Part 125 is included in the final rule for operators holding a Part 123 certificate on the effective date of Part 125, deletion of Part 123, as proposed, is inappropriate. Therefore, § 43.15(a) is amended by adding the words "Part 125" following "Part 123" in the first sentence of the section.

PART 65

The Notice proposed revising §§ 65.85 and 65.87 to specifically include the privilege of conducting the inspections required by new Part 125. However, § 65.81 presently includes, as the privilege of a certificated mechanic, the performance and supervision of maintenance of an aircraft or appliance for which the mechanic is rated. Since, by definition, inspection is a part of maintenance, these persons may conduct any inspection except those which are excluded by another rule. Further, these persons are authorized by Part 43 to perform maintenance and approve it for return to service. Therefore, revision of §§ 65.85 and 65. 87 is not required and the proposed revision is withdrawn.

PART 91

§ 91.54 Truth in leasing clause requirement in leases and conditional sales contracts.

Since Part 123 will not be revoked as proposed, but continues in effect until Janury 1, 1983, § 91.54 is amended by inserting the number "125" following the number "123" in § 91.54(b)(1)(ii) of the present rule.

§ 91.181 Applicability.

For the same reasons explained in § 91.54, § 91.181 is amended by adding the number "125" after "123" in paragraphs (a) and (b). The number "123" is retained in both paragraphs.

SUBPART E, PART 91—OPERATING NOISE LIMITS

The preamble to Notice 79-19 states that it does not propose to alter the requirements applicable to any particular aircraft under Part 91, Subpart E, even though it would be included in a new class for purposes of Part 125. The preamble also states that necessary editorial changes would be made to Subpart E on the basis of the Part 125 proposal. Those changes are accomplished in a separate rulemaking action.

PART 121

§ 121.1 Applicability.

Section 121.1(a)(5) is amended to require most commercial operators to operate under the rules of Part 125. Some operators, including those operating airplanes with over 30 passenger seats and 7,500 pounds maximum payload capacity as intrastate common carriers and those operating helicopters, will continue to operate under the rules of Part 121. Intrastate common carriers are not within the scope of Part 125. The proposal in the notice is revised to conform to the airplane size dividing line for Parts 121 and 135 which appears at various places in the regulations, including § 121.9, SFAR 38, and § 135.1. Under the revision, intrastate common carriers operating airplanes having a seating capacity of more than 30 passengers or a maximum payload capacity of more than 7,500 pounds will continue to operate under the rules of Part 121 and those operating airplanes having a seating capacity of 30 passengers or less and a maximum payload capacity of 7,500 pounds or less will continue to operate under the rules of Part 135.

§ 121.53 Duration of certificate.

To allow the timely transition of most commercial operators from § 121.1(a)(5) to Part 125, § 121.53 is amended to allow those operators certificated on the effective date of Part 125 to continue to operate under the rules of Part 121 until January 1, 1983. In addition, it allows certain operators, if they make timely application, to continue to conduct operations under Part 121 after January 1, 1983. This provides time for commercial operators to decide whether they should become common carriers under Part 121 or become certificated under Part 125. Section 121.53(f)(2) is revised to be consistent with the revision discussed under § 121.1.

PART 123

For the reasons expressed regarding § 91.54, the proposal is revised to revoke Part 123 effective January 1, 1983.

PART 135

§ 135.1 Applicability.

Section 135.1 is revised to be consistent with the amendments to §§ 121.1, 121.53, and the applicability of Part 125. Part 135 will continue to apply to commercial operators operating aircraft with a maximum seating capacity of less than 20 passengers or a maximum payload capacity of less than 6,000 pounds. In addition, since Part 125 does not apply to any common carriage operation, persons conducting common carriage operations solely between points entirely within any state of the United States in aircraft having a maximum passenger seating capacity of 30 seats or less and a maximum payload capacity of 7,500 pounds or less will continue to be governed by the rules of Part 135. Appropriate clarifying changes are made in § 135.1 to accomplish the above results and to make it consistent with § 121.9 and SFAR 38.

PART 145

§ 145.2 Performance of maintenance, preventive maintenance, alterations, and required inspections for an air carrier or commercial operator under the continuous airworthiness requirements of Parts 121 and 127, and for airplanes under the inspection program required by Part 125.

Section 145.2 is amended to include an additional authorization for repair stations to perform maintenance, preventive maintenance, alterations, and inspections of airplanes operated in accordance with Part 125. The existing paragraph is redesignated paragraph (a) and a new paragraph (b) is added which requires repair stations conducting inspections on the aircraft to do the work in accordance with the inspection program approved for the operator of the airplanes involved. Section 145.2 is adopted as proposed.

PART 125

SUBPART A—GENERAL

§ 125.1 Applicability.

This section prescribes the applicability of Part 125 and contains a significant number of changes from the proposal based upon the comments and subsequent FAA evaluation.

The Notice proposed to cover airplanes certificated to carry 20 or more passengers or a maximum payload of 5,000 pounds or more. The payload is changed to 6,000 pounds or more in response to comments from corporate flight departments which point out that airplanes between 5,000 and 6,000 pounds payload capacity would be subject to the rule even though they do not differ significantly from other business jets not covered by the rule. It was also stated that operations of these airplanes have not presented problems in the past. The FAA's own analysis of these assertions confirms that they are valid and that it is possible to meet the needs of the public while at the same time narrowing the scope of the regulation.

The word "capacity" is added to the phrase "or a maximum payload" to clarify that it is the payload capacity of a particular type airplane which governs applicability, not the actual payload being carried. For these same reasons, "having a seating capacity of" is substituted for "certificated to carry." It is recognized that the original seating capacity and payload capacity may be modified by a supplemental type certificate (STC). However, it is not the intent of this rule that an STC be issued to evade the applicability of Part 125.

As stated in the notice, the rule does not apply to airplanes required to be operated under Part 121, 135, or 137 of Chapter 1. This excludes air carrier and agricultural operations from Part 125 because those rules provide appropriate regulation of those operators.

In response to several comments, a provision is added which excludes airplanes that have been issued restricted, limited, or provisional airworthiness certificates or experimental certificates. These airplanes are excluded from the applicability of Part 125 since they are operated under special conditions and for special purposes which make compliance with Part 125 impractical. Additionally, §§ 91.39, 91.40, 91.41, and 91.42 specify operating limitations for these airplanes, thereby precluding the need for certification under another rule. Airplanes which have been issued special flight permits are also excluded from the applicability of Part 125 since the flight destination, route, operating limitations, and other limitations deemed appropriate by the Administrator are specified as part of the special flight permit. Certification under Part 125 in these cases would not only be impractical for the industry and administratively burdensome to the FAA, but impossible in most instances since inability to comply with an existing rule is normally the basis for issuing a special flight permit.

Another provision is added, based on the comments, which allows airplanes operating without passengers or cargo for training, ferrying, positioning, or maintenance purposes to operate under Part 91. Because Part 125 operations are based on passenger seating or payload capacity, the proposal, if adopted, would have required training, ferrying, positioning, or maintenance test flights to be operated under the rules of Part 125 even

though no passengers or cargo are carried on those flights. Parts 121 and 135 permit such flights to operate under Part 91. The proposed rule would have been more restrictive than those of Parts 121 and 135. The rule, therefore, is modified to allow airplanes to be operated under Part 91 without passengers or cargo for training, ferrying, positioning, or maintenance purposes.

An applicability exclusion similar to that discussed in the preceding paragraph is added to preserve present regulatory concepts which permit operators certificated under Part 121, 135, or 137 to conduct operations such as ferry flights, training flights, positioning flights, maintenance test flights, carriage of company officials, and other operations for which no charge is made, under the rules of Part 91. Operational experience with respect to those operations is satisfactory and there is no demonstrated need to require them to be conducted under Part 125.

Deviation authority is included. This is more fully discussed under § 125.3.

As proposed in the notice, Part 125 applies to operation of the described airplanes by foreign citizens. The entire Part applies to any operation conducted in the United States. Outside the United States compliance with only the airplane maintenance inspection program is required. Requiring the foreign citizen operator to comply with all of Part 125 for any operation within the United States establishes a level of safety equivalent to that required of U.S. citizens operating airplanes in the United States. Operations to a territory, possession, or a coastal city such as Key West would be an operation in the United States even if the airplane remains only a short time and is then flown outside the United States. Therefore, any foreign citizen intending to operate to a point in the United States is required to complete the entire certification process under Part 125 before the operation can be conducted. Provisions are included for the issuance of a special flight permit to allow operations into the United States for the purpose of becoming certificated under Part 125. Compliance with only § 125.247 is required for operations conducted outside the United States. This ensures a satisfactory level of airworthiness and is responsive to treaty obligations. In addition, there is some indication that U.S. registration is used by some foreign citizens as the aviation counterpart of the maritime "flag of convenience." Part 125 will enable the FAA to monitor and enforce obligations on these operators more effectively than in the past.

The rule provides for deferred compliance dates for persons holding a certificate under Part 123, a certificate under the commercial operator rules of Part 121, or operations specifications under Part 129. Several air travel clubs comment that they oppose being included in Part 125 because the level of safety under Part 125 is lower than under Part 123 and insurance premiums will be higher if operations are conducted under Part 125. Other air travel clubs favor the proposal. This illustrates the difficult regulatory problem which the FAA encounters in carrying out the DOT Task Force recommendation that a single set of rules be developed for all noncommon carrier commercial-in-nature operations of the affected airplanes. As previously discussed in this preamble, the DOT Task Force also recommended elimination of Part 123. In solving this regulatory problem the FAA used its best judgment in tailoring a set of regulations to arrive at what is considered to be an appropriate level of safety under Part 125. If an air travel club determines that for insurance or other reasons it desires to operate at a level of safety higher than Part 125, it may do so. For example, it may continue to insist that its pilots meet qualifications exceeding the minimum levels specified in the rule. The air travel club may elect to become certificated as an air carrier under Part 121. In some cases it may be appropriate for the air travel club to request amended operations specifications to allow operation under rules differing from Part 125. Use of amended operations specifications would not prove to be unduly burdensome to either the operator or the FAA. The proposal is modified to provide air travel clubs a compliance date of January 1, 1983. This allows air travel clubs now in operation adequate time to decide whether to expand into the air carrier field or operate under Part 125 and, once that decision is made, adequate time to implement it. Since only existing Part 123 operators are covered by the deferred compliance date, no new applications for certification under Part 123 are allowed after the effective date of Part 125.

Certificated Part 121 commercial operators are also allowed until January 1, 1983, to decide whether to seek certification as air carriers or operate under Part 125. With the exception of intrastate common carriers, no new applications for certification as a commercial operator under Part 121 will be allowed after the effective date of Part 125.

Under another modification to the proposal, foreign air carriers holding operations specifications under Part 129 on the effective date of Part 125, and those who obtain operations specifications after that date, are not required to comply with Part 125 until January 1, 1983. This deferred compliance date is included because the agency is considering a regulatory project to revise Part 129. It would not be appropriate to subject foreign air carriers to Part 125 until the agency determines the proper action on Part 129.

§ 125.3 Deviation authority.

Notice 79–19 contains an extensive discussion of possible ways of excluding corporate flight department operations from Part 125. This was in recognition of the fact that these operations have an excellent safety record under Subpart D and have disclosed no compliance or enforcement problems. The notice preamble suggests that the commenters consider an outright applicability exclusion or deviation authority.

The general thrust of the comments is that the payload capacity "floor" should be raised from 5,000 pounds to 6,000 pounds and that deviation authority should be provided in the rule. The basis for increasing the payload capacity floor to 6,000 pounds is discussed under § 125.1.

Devaition authority is included in the final rule to provide a reasonable degree of flexibility to assess operations otherwise subject to Part 125 which may be safely and satisfactorily conducted without compliance with all or part of Part 125. This is a limited form of deviation authority in the sense that it is expected that, in virtually all cases, the deviation would be sought from a few specific sections. However, the agency recognizes that there may be operators who qualify for a deviation which would require them to comply with another set of rules. Since deviation authority must be the subject of an application in a form and manner acceptable to the Administrator, the FAA will scrutinize closely each operation and the circumstances as part of its decisionmaking process. In addition, if a deviation is warranted, the FAA will fashion appropriate safeguards and limitations. These will be placed in the operations specifications of an operator certificated under Part 125, or in the deviation letter of any operator given a deviation from the entire Part. Consistency in the granting of deviation authority is achieved by the provision that only the Associate Administrator for Aviation Standards may issue letters of deviation authority.

The FAA will prepare an advisory circular which will discuss the deviation authority procedure and those items which must be submitted with each request. For example, it is intended that the facts of each operation be fully disclosed to the FAA. This will ensure that the deviation request is not an attempt, for example, to conduct commercial operations under Part 91 rules.

§ 125.5 Operating certificate and operations specifications required. (proposed § 125.3)

Section 125.5(b) makes the rules of Part 125 applicable to anyone who engages in operations covered by Part 125 without an appropriate certificate and operations specifications. This is an enforcement tool. The words "or a letter of deviation authority issued under § 125.3" are added after the word "Part" to make the rules of Part 125 applicable to an operator who does not hold a letter of deviation authority.

§ 125.7 Display of certificate. (proposed § 125.5)

A provision is added to require that a true copy of the certificate and any letter of deviation authority be carried in each of the operator's airplanes. This permits the Administrator, in any inspection of an airplane, to determine immediately those rules under which the airplane is operating.

§ 125.9 Definitions. (proposed § 125.7)

This section is adopted as proposed except that the word "capacity" is added following the word "payload" in § 125.9(a). This is done to be consistent with the terminology of § 125.1(a). Additionally, the word "rotor" is deleted from paragraph (b) of the section because it is not appropriate in a rule applicable to airplanes only.

§ 125.11 Certificate eligibility and prohibited operations.

Part 125, as proposed in the Notice and as adopted in this final rule, does not permit common carriage. To fully implement this basic concept, this section is added.

Paragraph (a) prohibits the issuance of a Part 125 certificate to any person authorized to operate airplanes under any Air Carrier Operating Certificate issued by the FAA. Paragraph (b) prohibits a Part 125 certificate holder from conducting any operation which results directly or indirectly from any person's holding out to the public to furnish transportation. This prohibits a Part 125 certificate holder from receiving referral business originating in a holding out to the public by any person, including holders of an Air Carrier Operating Certificate.

SUBPART B—CERTIFICATION RULES AND MISCELLANEOUS REQUIREMENTS

§ 125.25 Management personnel required.

Three commenters object to § 125.25 as being "too vague" or "not specific" regarding the use of the word "qualified" in describing the management personnel required. The rule specifies the objective that the management must be capable of achieving, that is, that the management personnel are capable of assuring that the certificate holder's operations are conducted in accordance with the requirements of Part 125. Since no specific qualifications were proposed, such as those prescribed in §§ 121.61 and 135.39, the word "qualified" is deleted.

In § 125.25(b)(3), the designation of "one qualified person" is changed to "a person," not only for the aforementioned reasons but also to afford the certificate holder more flexibility by permitting the designation of more than one person when the person primarily designated is absent for reasons such as illness or vacation.

§ 125.29 Duration of certificate.

Two commenters recommend that a certificate issued under Part 125 be for a duration of 1 year, at which time the certificate holder would be required to requalify as is currently required in Part 123 for air travel clubs. This was not proposed for comment in the notice. The FAA will review the need for such a provision as operating experience accrues under Part 125. It also should be noted that the rule authorizes the Administrator to suspend or revoke a certificate for any cause that, at the time of suspension or revocation, is grounds for denying an application for a renewal of certificate. This provision provides a measure of control over certificates issued under Part 125.

§ 125.31 Contents of certificate and operations specifications.

Section 125.31 is revised to delete references to special en route authorizations and limitations because Part 125 operations will not involve fixed or designated routes. References to special airport authorizations and limitations are deleted for the same reason.

§ 125.35 Amendment of operations specifications.

One commenter states that the phrase "the amendment becomes effective not less than 30 days after the holder receives notice of the adoption of the amendment" in § 125.35(d) is not clear in its intent or application. The intent is to require a 30-day lead time for FAA-initiated amendments to existing operations specifications. To clarify the application of the rule, the phrase has been changed to read "that amendment becomes effective. . . ."

Proposed § 125.37 Emergency evacuation.

One commenter states that this item should be amended so that present operators who have already demonstrated emergency evacuation ability will not have to repeat the process. The title of this section, as proposed, is misleading because § 125.189 contains the provisions for emergency evacuation. However, in considering the comment, the FAA noted that § 125.37 duplicates some aspects of Appendix A. Therefore, proposed § 125.37 is withdrawn and the remaining sections in Subpart B are renumbered accordingly.

§ 125.37 Duty time limitations. (proposed § 125.39)

Several commenters object to this rule as proposed. Some recommend that the rule be made more stringent by using the same language as that contained in the flight time limitations of Part 121. Other commenters consider the rule too restrictive because it severely limits flexibility of operation. The rule, as proposed, is the same as that prescribed for air travel clubs. Consideration was not given in Notice 79–19, however, to providing for augmented crews on extended flights. Proposed § 125.39, therefore, is renumbered § 125.37 and is revised to include an additional provision whereby the Administrator may specify other rest, flight time, and duty time limitations in the operations specifications. In specifying other provisions, the Administrator considers the circumstances of the particular operation.

§ 125.45 Inspection authority. (proposed § 125.47)

Proposed § 125.47 is renumbered § 125.45 and is revised by appropriate reference to a letter of deviation authority to be consistent with the deviation authority provided for in § 125.3.

§ 125.49 Airport requirements. (proposed § 125.51)

Proposed § 125.51(c) is amended by substituting the words "their use" for the word "it" to permit approval of the use of flare pots or lanterns. Section 125.51 is renumbered § 125.49.

§ 125.53 Flight locating requirements. (proposed § 125.55)

One commenter objects because this rule does not propose the requirement to file an FAA flight plan for all flights, as required of air travel clubs under Part 123. This is another example of the difficult regulatory problems encountered by the FAA in tailoring a set of regulations to apply to the diverse types of operations which are included in Part 125. In dealing with that problem, the FAA elected to tailor this section after a Part 135 provision to prescribe those procedures that must be established by the certificate holder for locating each flight for which an FAA flight plan is not filed. This recognizes that operations under Part 125 will involve remote locations where it is not possible to file a flight plan. The FAA will monitor the operating experience under this regulation and will not hesitate to propose different rules if that is deemed advisable. Section 125.55 is renumbered § 125.53 and is adopted as proposed.

SUBPART C—MANUAL REQUIREMENTS

The manual requirements in this subpart reflect a methodology to ensure that procedures and policies essential for safe operations are readily available for the guidance of flight, ground, and maintenance personnel. Therefore, with the exception of minor changes, the subpart appears as proposed.

§ 125.71 Preparation.

One commenter states that while § 125.71 requires the certificate holder to prepare and keep current a manual for the guidance of personnel, Part 125, as proposed, did not require the certificate holder to comply with that manual. Compliance with the requirements of the certificate holder's manual is made mandatory by operations specifications. Therefore, § 125.71 is adopted as proposed except the phrase "other than

one who is the only pilot used in certificate holder's operations," is deleted since it is unlikely that airplanes certificated for only one pilot would fall under Part 125.

§ 125.73 Contents.

One commenter notes that, as proposed, this section would delete the requirement for the revision number to appear on each revised page. This was not intentional and the rule, as adopted, includes this requirement. In addition, proposed paragraph (q) is redesignated (r) and a new paragraph (q) is added. It requires inclusion of the identity of each person authorized to administer tests required by this Part and designation of the tests authorized to be given by that person. This is necessary to ensure that responsibility for administering required tests is clearly established.

§ 125.75 Airplane flight manual.

Section 125.75 is changed by deleting "type of transport category" in paragraph (a) and "transport category" in paragraph (b). Part 125 covers operations of airplanes which may not be transport category type airplanes; however, the requirement for carriage of airplane flight manuals or approved equivalent is essential in providing an adequate level of safety in all operations under Part 125.

Sections 125.75(a) and (b) are revised to allow an approved equivalent of the Airplane Flight Manual to be used for those airplanes that were not required by type certification to have an Airplane Flight Manual. In addition, paragraph (b) is clarified to allow the manuals required by §§ 125.71 and 125.75 to be combined.

SUBPART D—AIRPLANE REQUIREMENTS

§ 125.91 Airplane requirements: general.

This proposal includes a requirement that each airplane be weighed before being placed in service under Part 125 and reweighed every 3 years thereafter. Two commenters object to the requirement because it does not contain an exception for airplanes that have been weighed within the last 3 years. The FAA agrees that if an airplane has been weighed within 3 years of being placed in service under Part 125, it is unnecessary to reweigh the airplane when it enters Part 125 service. The rule is revised accordingly. In addition, a provision is added which states that the empty weight and center of gravity need not be ascertained if an airplane has been issued an original airworthiness certificate within the 36 calendar months preceding the operation. The procedure for issuing an original airworthiness certificate includes satisfactory determination of empty weight and center of gravity.

§ 125.93 Airplane limitations.

One commenter requests that the privileges afforded by Special Civil Air Regulation SR411B, recodified as §§ 121.198 and 129.23 of the Federal Aviation Regulations, be extended to operations conducted under Part 125. The commenter states that this could be accomplished as a second paragraph to § 125.93. The commenter further states that "if this section is not included we will lose an operating privilege that we now enjoy as a commercial operator of large aircraft (Douglas DC-7B)."

The agency did not contemplate that overweight operations would be conducted under Part 125 and hence there were no proposals to permit them. They require special safeguards to ensure an adequate level of safety. The commenter may petition for exemption which, if justified, could include appropriate safeguards.

SUBPART E—SPECIAL AIRWORTHINESS REQUIREMENTS

Sections 125.111 through 125.187 bring to Part 125 the substance of §§ 121.213 through 121.289. These special airworthiness requirements provide an applicant under Part 125 the privilege of using certain airplanes not certificated under Part 4b of the Civil Air Regulations, Part 25 of the FAR, or which do not meet Special Civil Air Regulations 422/422A or 422B. Since this privilege is afforded certificate holders under Part 121,

it is appropriate that it be afforded certificate holders under Part 125. Further, since carriage of passengers for compensation or hire is permitted under both Parts 121 and 125, it is appropriate that these sections be comparable.

§ 125.189 Demonstration of emergency evacuation procedures.

The specific requirements of Appendix B are applicable to those operators who are required to demonstrate emergency procedures in accordance with § 125.189. Several commenters suggest that airplanes for which emergency evacuation procedures previously have been demonstrated by the manufacturer or other person satisfy the requirement of this Part. The FAA does not agree. Manufacturers are required by § 25.803(c)(7)(ii) to use airline crews in their demonstrations and the Administrator approves training programs of the airlines. There are no training requirements in Part 125 so the Administrator must ensure that each operator's procedures are satisfactory. Provisions are made in §§ 125.189(b) and (d), however, to relieve certificate holders who previously have demonstrated required procedures in the same type and model airplanes under Part 121 or 123 from redemonstration for certification under Part 125.

SUBPART F—INSTRUMENT AND EQUIPMENT REQUIREMENTS

§ 125.207 Emergency equipment requirements.

Section 125.207(c) is deleted because it duplicates § 125.247(a)(3) which requires that each item of required equipment be regularly inspected.

§ 125.209 Emergency equipment: extended overwater operations.

Section 125.209(a)(2) is revised to require each liferaft to be of an approved type. This is consistent with other provisions of the FAR. This change is based upon the safety consideration that liferafts must be suitable for use in the event of a ditching or other incident.

§ 125.215 Operating information required.

One commenter states that the checklist required by this section is not required to be approved. This is true; however, § 125.215 requires that the checklist be appropriate. This provides an adequate level of safety.

§ 125.219 Oxygen for medical use by passengers.

One commenter indicates that § 125.219(b) is ambiguous or contradictory but did not explain his reasons. The intent of the rule is to prohibit smoking within 10 feet of where medical oxygen is being used or stored. This is a minimum standard and nothing prohibits the pilot in command from prohibiting smoking in the entire airplane when medical oxygen is in use.

§ 125.221 Icing conditions: operating limitations.

Paragraphs (b) and (c) are editorially changed to make it clear that ice protection equipment must meet the requirement of Appendix C of Part 125. The notice erroneously referred to § 34 of Appendix A to Part 135. This does not involve a substantive change.

§ 125.223 Airborne weather radar equipment requirements.

Section 125.223 requires airborne weather radar. One commenter states that this requirement is not needed in its operations which seldom involve flights beyond a radius of 5 miles from takeoff. Section 125.223 provides for situations where radar may not be required and § 125.3 provides for deviations. Operators may be able to justify deviation authority from this requirement.

SUBPART G—MAINTENANCE

§ 125.241 Applicability.

No comments were received concerning § 125.241 and, except for editorial changes, § 125.241 appears as proposed in the notice. The editorial changes are not substantive and consist of: the deletion of the words "and inspection" from the title of the subpart;

substitution of the words "aircraft engine" for "airplane engine"; and the addition of the phrase "and their component parts" to the text.

The words "and inspection" are redundant since, by definition, inspection is a part of maintenance.

The words "aircraft engine" are substituted for "airplane engine" since "aircraft engine" is defined in Part 1. Further, by definition, an airplane is an aircraft and, therefore, only aircraft engines are eligible for installation on airplanes. Even though Part 125 is applicable to airplanes only, the introduction of a new term might cause confusion and is not required to accomplish the objective of the regulation.

The phrase "and their component parts" is added since, in some instances, parts of airframes, aircraft engines, propellers, appliances, and survival and emergency equipment may be maintained and approved for return to service when disassociated from the products of which they are a part. The addition clarifies a requirement which has been understood; that is, rules which apply to the whole, apply to the part.

§ 125.243 Certificate holder's responsibilities.

One commenter states that §§ 125.243 and 125.249 are in conflict because the former assigns responsibility for maintenance to the certificate holder, while the latter makes reference only to inspections. Section 125.243 makes the certificate holder primarily responsible for airworthiness, the performance of maintenance, preventive maintenance, alteration, and for ensuring that personnel accomplishing these functions make appropriate entries in the airplane and maintenance records. Section 125.249 deals only with the contents of the certificate holder's manual. However, the manual and its contents are only parts of the holder's responsibility. The sections are not actually in conflict; rather, one supplements the other.

The repetitious language of paragraphs (a) and (b) in the notice is reduced by rearrangement. Additionally, clear standards for entries for which the certificate holder is responsible are substituted for the indefinite term "appropriate" appearing in paragraph (d) of the notice. These editorial changes are not substantive and the requirements of the section are unchanged from those proposed in the notice.

§ 125.245 Organization required to perform maintenance, preventive maintenance, and alteration.

Section 125.245 requires a certificate holder to determine that persons with whom the holder arranges for maintenance, preventive maintenance, or alteration have organizational structures sufficient to reasonably ensure that the work arranged for will be completely and properly accomplished and that required record entries regarding that work will be made. The certificate holder must also determine that the organizational structure is sufficient to support the required inspection provisions of § 125.249(b)(2). This requirement is emphasized because some organizations, while adequate for performance of the work involved, may have insufficient personnel to meet the required inspection provisions of § 125.249(b)(2).

One commenter states that the phrase "enough qualified management personnel" used in § 125.25 affords too much latitude to the FAA regarding the certificate holder's management organization, and that the same is true for § 125.245. The reference to § 125.245 apparently relates to the phrase "organization adequate to perform" which appears in that section. Both phrases, however, have been used in Part 121 for several years without a history to support the commenter's position and, therefore, appear as proposed.

The title of § 125.245 is changed to make clear that the section deals with the organization required to perform specific functions as opposed to the organization of the functions. Additionally, paragraphs (a) and (b) are condensed to eliminate repetitious language appearing in the notice. However, no substantive change to the provisions of the notice is made.

§ 125.247 Inspection programs and maintenance.

Two commenters state that "hard-time overhauls" under § 125.247(e) of the proposal impose unrealistic limitations and an unnecessary economic burden on operators. One of these commenters suggests that "power deterioration criteria" provided by engine manufacturers would be more realistic in determining the need for engine overhauls.

The use of manufacturer's recommended overhaul times establishes a basic requirement for each certificate holder, but does not limit the holder to those times indefinitely. Certificate holders will not be able to use overhaul times established, for example, by a Part 121 operator who may have substantially extended overhaul times based on specific maintenance procedures, tests or checks, and experience which the Part 125 certificate holder may not have. The Part 125 certificate holder, however, will be permitted to extend overhaul times based on the holder's own procedures and experience, since the rule permits the certificate holder to develop its own programs. "Power deterioration criteria" could be a part of such a program if justified by the certificate holder.

A third commenter states that § 125.247 should not apply to U.S.-registered airplanes operated entirely outside the United States by other than U.S. citizens since the section requires the airplane to be inspected and maintained in a manner which may be contrary to the regulations of the governing State. Further, the commenter states that governing States would be forced to prohibit operations of U.S.-registered airplanes by operators of the governing States in order to fulfill their responsibilities under the Chicago Convention.

The commenter's analysis does not take into consideration the option in § 125.247(e)(3) (paragraph (e) of the notice) which provides that operators may develop their own programs. Such programs can be designed to meet the requirements of both the United States and the governing States.

It should be noted that § 125.247(a)(3) (§ 125.247(a) and (b) of the notice) speaks to both the inspection programs and maintenance, while § 125.247(d)(1) (§ 125.247(e) of the notice) speaks only to maintenance (engine overhaul times). Thus airplanes, including aircraft engines, propellers, appliances, survival and emergency equipment, and their component parts, must be inspected in accordance with an inspection program. Engines, in addition to the inspection requirements, must be maintained in accordance with manufacturer's recommended overhaul periods, or those approved by the Administrator. Both the inspection program required by § 125.247(d)(1) and the maintenance required by § 125.247(a)(1) and (a)(2) are to be made a part of the manual required by § 125.249.

The changes to § 125.247 clarify the requirements of the section by providing a breakdown of the section's requirements but do not result in substantive changes to the requirements proposed in the notice.

§ 125.249 Maintenance manual requirements.

One commenter recommends that maintenance personnel be permitted to "approve for return to service" by their initials and certificate numbers, rather than their names as required by § 125.249(b)(2) (§ 125.249(c)(3) of the notice). This is a deviation from the requirements of Part 43 and, since Part 125 does not otherwise deviate from Part 43, doing so in this instance would introduce ambiguity in the requirements of the two Parts.

Another commenter objects to the "required inspection" requirements of § 125.249(a)(3)(ii) (§ 125.249(b)(2) of the notice), stating that such inspection does not enhance safety when the work force is small or when shift work is not involved. However, certificate holders will not have control of either the use of shift work or work force size when arrangements are made with others to accomplish maintenance. Further, the privilege of arranging for others to accomplish certain maintenance functions will be used, at one time or another, by most certificate holders, including those who have maintenance facilities of their own. Additionally, shift work and work force size are only two of many reasons for using required inspection procedures. Therefore, the provisions of § 125.249(b)(2) of the notice are adopted without substantive change as § 125.249(a)(3)(ii). The section is rearranged and, for the purpose of clarity, § 125.249(b) is made specific and consistent with Part 43, since variance from Part 43 is not intended.

§ 125.251 Required inspection personnel.

One commenter states that § 125.251 requires neither a training program nor a determination of qualification for maintenance personnel and thus does not provide the same level of safety as Part 123. However, under Part 125 required inspections may only be accomplished by certificated persons who are authorized by Part 43, while they may be accomplished by repairmen or other personnel, after training and a determination of qualification under Part 123. The limitations imposed by Parts 43, 65, and 145, plus the determination of qualification made under § 125.245, will provide a level of safety at least the equivalent of Part 123. The section, therefore, is adopted without change.

SUBPART H—AIRMAN AND CREWMEMBER REQUIREMENTS

One commenter recommends that the airman and crewmember requirements be the same as those under Part 123. These were not proposed because the FAA made certain judgments in selecting the provisions for Part 125 and it is not essential to carry over these requirements from Part 123. Operating experience will be closely monitored and more stringent provisions will be proposed if necessary.

§ 125.263 Composition of flightcrew.

One commenter objects to the proposed rule because it lacks the specific training program requirements to be used to qualify a pilot in the performance of flight engineer duties and allows any flight crewmember to perform these duties. The commenter fails to consider that a fully qualified flight engineer will be part of the flightcrew of any airplane for which the type certificate requires a flight engineer. It further provides that a flight crewmember qualified to perform duties of a flight engineer in case of incapacitation must be aboard each flight.

§ 125.267 Flight navigator and long-range navigation equipment.

Section 125.267(a)(2) is revised to require two independent long-range navigation means that are approved. In the present and future navigation of oceanic areas, flight tracks must be maintained within certain limits. If the navigation system failed, it would be impossible to maintain those tracks. Therefore, the requirement is increased to provide a functioning backup system. The wording, "specialized means of navigation," implies that Doppler radar or Inertial Navigation System must be used. This has been changed to read "long-range navigation" to allow use of Omega, "Loran-C," or any other long-range navigation system approved in the future.

One commenter states that the phrase "reliably fixed" is not clear and the requirement for a navigator, when the airplane position cannot be reliably fixed for more than 1 hour, is too restrictive. The term "reliably fixed" has been successfully used in Part 121 and is necessary to provide acceptable accuracy for air traffic control purposes. This section requires a navigator or approved long-range means of navigation which enables a reliable determination of the airplane's location by each pilot seated at the pilot's duty station. The FAA concludes that this requirement is realistic considering the present state-of-the-art of navigation systems and the increase in flights in oceanic and remote areas.

§ 125.269 Flight attendants.

One commenter objects to basing the requirement for flight attendants on the number of passengers carried and not on seating capacity. The commenter also objects because there were no proposed requirements for a flight attendant for less than 19 passengers. The rule is consistent with the flight attendant requirements of § 91.215 which applies to large airplane operations. It bases the flight attendant requirements on the number of passengers on the airplane, and none are required if less than 20 passengers are carried. The FAA considers those requirements to be satisfactory for the noncommon carrier operations which will be conducted under Part 125. Proposed § 125.269 is adopted without change.

SUBPART I—FLIGHT CREWMEMBER REQUIREMENTS

§ 125.281 Pilot-in-command qualifications.

Three commenters recommend that the pilot-in-command qualifications include a requirement for an airline transport pilot certificate. Other than total flight time as a pilot of at least 1,200 hours rather than 1,500 hours, the aeronautical experience requirements are identical to those required for an airline transport pilot certificate. The primary reason for establishing these standards is because there are highly qualified pilots who do not meet the requirements for a first class medical certificate and therefore do not hold an airline transport pilot certificate. The FAA considers these operations to be commercial in nature which requires a commercial pilot certificate, along with required aeronautical experience, to provide an acceptable degree of safety. Paragraph (c) is deleted because the requirements of Part 61 are applicable and those requirements need not be restated in this section.

§ 125.285 Pilot qualifications: recent experience.

One commenter states that in §§ 125.285 through 125.295, use of the terms "check airman," "approved check airman," "authorized check pilot," and "authorized check airman" require clarification as to whether or not these terms are synonymous. The FAA agrees that this should be clarified; therefore, the term "authorized check airman" is used in place of "check airman," "approved check airman," or "authorized check pilot" where such terms appear in this subpart.

Proposed § 125.285(c)(2), which required a pilot to be currently qualified in another airplane of the same group, is deleted. This is too restrictive because it does not allow a certificate holder operating only one type of airplane in the same group to allow its pilots to use a visual simulator to reestablish recency of experience.

Proposed § 125.285(c)(3) is redesignated (c)(2) and the word "training" is changed to "testing" because Part 125 contains no training requirements. Thus, the landings required in the airplane must be made within 45 days following completion of simulator testing.

§ 125.287 Initial and recurrent pilot testing requirements.

One commenter objects to the absence of a requirement for flightcrew initial or recurrent training. Training programs are required for air carriers because they are required by the Federal Aviation Act of 1958 to provide the highest degree of safety. Under the Part 125 regulatory design, reliance is placed upon required tests and checks to ensure that airmen are proficient. These tests and checks are adequate to ensure an acceptable level of safety in Part 125.

§ 125.291 Pilot in command: instrument proficiency check requirements.

One corporate flight department states that the required 6-month pilot-in-command instrument proficiency check, as opposed to once each 12 months, is an added requirement "not justified by the excellent safety record of the FAR 91, Subpart D, operator." The FAA does not agree. Corporate operations are only one segment of those covered by Part 125. The regulatory design of Part 125 emphasizes tests and checks in lieu of training requirements. This requirement is part of that philosophy which is applied to all Part 125 operations to ensure pilot competency.

Section 125.291 is changed to require each pilot in command to demonstrate only those instrument approach procedures which the certificate holder desires to use instead of at least one instrument approach using an ILS, VOR, and NDB facility as proposed. The letter of competency will be limited to those facilities and types of procedures satisfactorily demonstrated. This will ensure an adequate level of safety.

§ 125.293 Crewmember: tests and checks, grace provisions, accepted standards.

One commenter asks if this rule means that a person who is unable to demonstrate a satisfactory performance on a pilot-in-command check could serve as a second in command if the tests and checks applicable to a second in command have been satisfactorily

demonstrated. The proposal would have precluded serving as second in command. Upon reconsideration, the proposal is revised to provide that the certificate holder may not use the pilot, nor may the pilot serve, in the capacity for which the pilot is being checked in operations under Part 125 until the pilot has satisfactorily completed the check. This permits a pilot in command who fails the pilot-in-command checks to serve as second in command if qualified and if the tests and check applicable to a second in command have been demonstrated satisfactorily.

§ 125.297 Approval of airplane simulators and other training devices.

One commenter recommends that approval of a simulator be automatic if the simulator is already approved under Part 121 for a certificated air carrier. While the simulator is an approved simulator, the use in checks by an operator under this Part must be specifically approved. The reason is that the air carrier that uses a simulator has an approved training program and the approval of the use of the simulator is predicated on its use in the training program and ensures that all phases of flight are covered. This is not true of a certificate holder under Part 125. For approval to use a simulator, the certificate holder must show the specific procedures and maneuvers that it plans to use in the testing of pilots.

SUBPART J—FLIGHT OPERATIONS

§ 125.311 Flight crewmembers at controls.

One commenter states that the requirement in § 125.311 deletes the provision in Part 91 that one crewmember use an oxygen mask above flight level 350 when one pilot leaves the flight station. The FAA disagrees. The requirement of § 91.32 must be complied with by operators under Part 125 since the rules of Part 125 are requirements in addition to the rules of Part 91, except Subpart D.

§ 125.313 Manipulation of controls when carrying passengers.

Several commenters object to the relaxation from Part 121 and 123 rules regarding persons at the controls of revenue passenger flights. In response to their comments, § 125.313 is revised to prohibit any persons from manipulating the controls during passenger flights except qualified pilots employed by the certificate holder operating that airplane.

§ 125.315 Admission to flight deck.

This rule prohibits admission of any person to the flight deck except for specific authorized categories. One category is "any person who has the permission of the pilot in command." One commenter expresses concern that this is too lax. The FAA does not agree. A pilot in command is responsible for the operation and safety of an aircraft. This includes the exercise of good judgment. If operating experience indicates the required judgment is not being exercised, appropriate restrictions will then be imposed.

§ 125.317 Inspector's credentials: admission to pilots' compartment: forward observer's seat.

Two commenters complain that providing an observer's seat in the cockpit for an FAA inspector is too restrictive for corporate flight department operations and aircraft manufacturers. The FAA considers this provision necessary to observe cockpit operations of the large airplanes which will be operated under Part 125. There may be specific, limited circumstances in which a deviation may be appropriate.

§ 125.325 Instrument approach procedures and IFR landing minimums.

This section is revised to provide more flexibility for the Part 125 operator. As it was proposed in the notice, each instrument approach procedure for each airport used by the Part 125 operator would be required to be listed in the operations specifications. This is an air carrier requirement and is not necessary for Part 125 operations. The revision requires that each type of instrument procedure to be used, such as ILS, NDB, and VOR, must be listed in the operations specifications. This will reduce the paperwork required of Part 125 operators.

§ 125.327 Briefing of passengers before flight.

Paragraph 125.327(e) is deleted because it duplicates the requirement in § 125.327(a) to conduct a briefing before takeoff. Therefore, § 125.327(f) is redesignated (e). The redesignated paragraph is revised to clarify that the "before overwater briefing" need not be given before takeoff but must be given before starting the overwater portion of the flight.

SUBPART K—FLIGHT RELEASE RULES

§ 125.359 Flight release under VFR.

One commenter states that the proposed rule removes the restriction for commercial operators to fly their airplanes under instrument flight rules (IFR). Present Part 121 does not require visual flight to be conducted under IFR. However, in some cases the operations specifications of Part 121 operators require all flights to be conducted under IFR. There may be circumstances under Part 125 where safety will require that all operations, including those under visual flight conditions, be conducted under IFR. The operations specifications of a Part 125 operator can be amended to impose such a requirement.

§ 125.365 Alternate airport for departure.

Reference to the word "dispatch" in the notice is deleted because Part 125 does not contain dispatching requirements.

§ 125.371 Continued flight in unsafe conditions.

One commenter states that it is not appropriate to continue flight in an unsafe condition and suggests that this provision is not necessary if there were a provision for an approved minimum equipment list (MEL) in Part 125. Section 125.201 makes this provision; however, the FAA does not agree that it eliminates the need for § 125.371. It is necessary to prohibit continuation of a flight toward the destination airport if it cannot be completed safely unless in the pilot's opinion there is no safe procedure. In that event, continuation of flight must be treated as an emergency situation.

§ 125.379 Landing weather minimums: IFR

The requirement that a pilot in command must have 100 hours in operations under this Part is deleted. Under the present Part 91, a pilot in command may use the lowest minimums authorized, and it is not a compromise of safety to allow pilots in command who have conducted operations under Parts 91,121, 123, and 135 to continue to do so under Part 125. However, because Part 125 allows operation for compensation or hire, there is a need for the pilot in command to have 100 hours in the type airplane before exercising the authority to descend to authorized minimums.

§ 125.381 Takeoff and landing weather minimums: IFR

The reference to radio range is changed to nonprecision approach procedures because there are no longer any radio ranges in the conterminous United States and nonprecision approach describes any procedure that is not a precision approach, that is, any procedure without vertical guidance. In addition, the provision that an approach may be continued if the plane is on a nonprecision approach and has reached the MDA is changed to the final approach segment. The final approach segment is defined and is pictured on approach charts. This makes nonprecision approaches consistent with precision and PAR approaches. Finally, the missed approach point (MAP) is substituted for the minimum descent altitude (MDA) in the last sentence, because MAP is a defined point and MDA is not a defined point.

One commenter states that § 125.381 prohibits any "look-see" approaches. The FAA agrees that this paragraph prohibits any approach when the weather is reported to be below minimums except in certain cases when the airplane is on the final approach segment. The FAA concludes that instrument approaches of airplanes covered by Part

125, in reported weather conditions below minimums, should be prohibited as part of the selective upgrade of safety from Part 91 levels. This section does not prohibit a "look-see" approach at an airport with an approved instrument approach procedure when that airport has no weather reporting facility. Descent below minimums is covered by Part 91 which must be complied with by Part 125 operators.

§ 125.383 Load manifest.

One commenter states that the requirement concerning landing weights is deleted. This is an inadvertent omission and § 125.383(a)(3), as adopted, includes landing weights. One commenter observes that the flight attendant names were required to appear in two places in accordance with §§ 125.383 and 125.403. The FAA agrees and the requirement for flight attendant names is deleted from § 125.383. The section is revised to require passengers' names on the load manifest. This requirement is the same as that required for supplemental air carriers, commercial operators, and air travel clubs.

SUBPART L—RECORDS AND REPORTS

§ 125.401 Crewmember record.

One commenter points out that § 125.401, as proposed, eliminates the requirements for maintaining crewmember training records. The commenter is correct. However, Part 125 does not contain training requirements and requiring training records would be inappropriate. Another commenter states that the requirement of § 125.401(a)(1) to maintain route check and route qualification records is inappropriate since such qualifications are not practical in the types of operations anticipated under Part 125. The FAA agrees that Part 125 will not involve fixed or designated routes and these requirements are deleted. However, the remaining records are considered essential to a certificate holder to ensure that crewmembers meet at least minimum qualifications for the operations conducted and are essential to the FAA in its routine surveillance activities. Except for the noted changes, § 125.401 is adopted as proposed.

§ 125.403 Flight release form.

One commenter states that requiring the names of all crewmembers to be included on both the load manifest and the flight release is redundant. The FAA agrees and § 125.403(a)(4) is changed to require the name and duty assignment of each crewmember. Flight releases provide an effective means by which the certificate holder may assign crewmember duties and provide information concerning the anticipated flight in a clear, concise form. Further, they provide a record of specific responsibilities in the event they come under discussion during or subsequent to the flight.

§ 125.405 Disposition of load manifest, flight release, and flight plans.

One commenter points out that requiring the pilot route qualification record to be carried in the airplane is inappropriate since route qualification is not practical under Part 125. The FAA agrees that Part 125 operations will not involve fixed or designated routes. Section 125.405(a)(4) is deleted. Section 125.405(a)(5) is redesignated (a)(4) and the intended route of the flight is made a required part of the flight plan. Except for these changes, the section is adopted as proposed.

§ 125.407 Maintenance log: airplanes.

The qualifying phrase "that is critical to the safety of flight" in proposed § 125.407(a) introduces a subjective test regarding action to be taken in response to reported or observed failures or malfunctions. It could result in some failures or malfunctions being repaired without appropriate maintenance entries. Part 43 requires a record of all maintenance or inspection, and since all other maintenance required in Part 125 must be done in accordance with Part 43, the proposal is in conflict with Part 43. Therefore, instead of developing a new system and complicating the regulatory structure, the FAA finds that the provisions of § 135.65(c) and (d) provide an adequate level of safety. Sections 135.65(c) and (d) are therefore incorporated as § 125.407 with the following

changes: The reference to rotor is deleted from paragraph (c); the phrase "the applicable maintenance requirements of this chapter" is deleted and "in accordance with Part 43" substituted; and "§ 125.249" is substituted for "§ 135.21" in paragraph (d). These changes are in concert with the substance of the notice.

§ 125.409 Reports of defects or unairworthy conditions.

No comments were received on this section which is a simplified procedure for the reporting of defects and unairworthy items. FAA Form 8010–7 will normally be used for these reports. However, if a certificate holder desires to use another reporting method, that method may be used provided it is made a part of the certificate holder's manual, required by § 125.249, and is approved by the Administrator. Additional material is added to the proposed section to clarify a time frame for submission of reports and to specify where reports are to be submitted. This permits the FAA to make timely use of the data in correcting deficiencies which adversely affect safety.

§ 125.411 Airworthiness release or maintenance record entry.

One commenter points out that since Part 125 does not provide for certificate holders to use "repairmen," the reference in § 125.411(a)(3) is inappropriate. The commenter is correct and the phrase "authorized in Part 43" is substituted. This eliminates the need for the last paragraph appearing under subparagraph (3) in the notice. The words "60 days" are substituted for "2 months" in paragraph(c) to eliminate the question of calendar months. Except for these minor changes, the section appears as published in the notice.

FEDERAL REPORTS ACT APPROVALS

* As adopted by these amendments, §§125.21, 125.35, 125.53, 125.71, 125.249,125.295, 125.319, 125.323, 125.383, 125.401, 125.403, 125.407. 125.409, and 125.411 will become effective 30 days after notice is published in the *Federal Register* that the requirements of these sections are approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.

ADOPTION OF THE AMENDMENTS

Accordingly, 14 CFR Chapter 1 is amended effective February 1, 1981, by adding to Subchapter G of 14 CFR Chapter 1 a new Part 125.

(Secs. 313, 601 through 610, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1421–1430 and 1502); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).)

Note.—The FAA has determined that this document involves a regulation which is significant under Executive Order 12044, as implemented by DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final regulatory evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "For Further Information Contact."

*A notice of approval by the Office of Management and Budget of the recordkeeping and reporting requirements of § § 125.21, 125.35, 125.53, 125.71, 125.249, 125.295, 125.319, 125.323, 125.383, 125.401, 125.403, 125.407, 125.409, and 125.411, was published in the Federal Register on December 22, 1980 (45 FR 84020). The notice made these sections effective Febur ry 1, 1981.

Amendment 125-1

Amendments of Effective Date of Part 125 and Amendments Adopted in Relation to Part 125

Adopted: January 30, 1981 **Effective: April 1, 1981**

(Published in 46 FR 10902, February 5, 1981)

SUMMARY: On January 29, 1981, the President issued a memorandum to certain agency heads directing that they issue a notice in the *Federal Register* postponing for 60 days after January 29, 1981, the effective date of regulations that have already been issued but were scheduled to become effective in the next 60 days. This amendment consistent with the President's directive, postpones the effective date of new Part 125 and related amendments from February 1, 1981, to April 1, 1981.

FOR FURTHER INFORMATION CONTACT: Harold E. Smith, Regulatory Projects Branch (AVS-24), Safety Regulations Staff, Associate Administrator for Aviation Standards, 800 Independence Avenue, SW., Washington, D.C. 20591, Telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Background

Part 125 was published in the Federal Register on October 9, 1980, (45 FR 67214). That Part, and related amendments to Parts 43, 91, 121, 123, 135, and 145 have an effective date of February 1, 1981. On January 29, 1981, the President issued a memorandum which directs that all agencies, by notice in the Federal Register, postpone for 60 days from January 29, 1981, the effective date of all regulations that have been promulgated in final form and that are scheduled to become effective during that 60 day period. Part 125, and regulations adopted with it, fall within the scope of the President's memorandum.

The President stated in his memorandum that the establishment of a new regulatory oversight program that will lead to less burdensome and more rational Federal regulations was among his priorities as President. He indicated that this program was especially important because of the country's economic climate.

In order to give his Administration, through the Task Force on Regulatory Relief, sufficient time to implement that process and to subject to full and appropriate review many recent regulations that would increase rather than relieve the current burden of restrictive regulation, he directed the postponement of pending regulations.

Consistent with this view, I am by this notice postponing for 60 days the effective day of Part 125.

Description of These Amendments

The effective date of Part 125 and of related Amendments 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 is changed from February 1, 1981, to April 1, 1981. In addition, in order to preserve the application and compliance procedure timing, certain dates specified in any of the related amendments listed in the preceding sentence are revised. However, although the effective date of Amendment 91-170A is changed from February 1, 1981, to April 1, 1981, the designation date of November 29, 1980, for applicable noise rules is unchanged.

Need for Immediate Adoption

The FAA realizes that the postponement of pending regulations may not be viewed by certain persons to be in their best interest. However, in accordance with the President's directive, the economic condition of the nation is such that the government must rethink the need and expense of each new regulation. For a new Administration and any new Department head to effectively accomplish this objective, some time is needed for

adequate review. Sixty days is the minimum period to accomplish such a review and the impact of such a delay will be minimal. For these reasons, the FAA is convinced that good cause exists for postponing for up to 60 days this effective date of this rule for 60 days and that the end result of such a delay, a more cohesive and effective regulatory program, is in the public interest. For similar reasons and because of this rule is scheduled to become effective very shortly, additional notice and public procedure on this change of effective dates is impracticable, unnecessary and contrary to the public interest and good cause exists for making these changes effective immediately. Since this change of effective dates must be accomplished immediately and does not involve rulemaking, compliance with Executive Order 12044 is also unnecessary.

Accordingly consistent with the President's memorandum of January 29, 1981, on Postponing of Pending Regulations, the effective dates of Part 125 is postponed until April 1, 1981.

Adoption of the Amendment

Accordingly, 14 CFR Chapter 1 is amended as follows:

1. By amending the effective date February 1, 1981, of Part 125 and Amendment Nos. 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 to read April 1, 1981 in each case.

2. By amending § 125.5 by revising the date "February 1, 1981" in paragraph (a) to read "April 1, 1981" and the dates "June 1, 1981" and "January 31, 1981" in paragraph (b) to read "August 1, 1981" and "March 31, 1981" respectively.

(Secs. 307, 313, 601 through 611, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1348, 1354, 1421-1431 and 1502); sec 6(c) Department of Transportation Act (49 U.S.X. 1655(c)); Title III, Aviation Safety and Noise Abatement Act of 1979 (94 Stat. 50).

Additional Actions Pending

In addition to the amendments adopted herein, the Agency has other regulatory actions as to which it has not been able to act to carry out the President's memorandum because they have been issued by the various FAA Regions. These include, but are not limited to, airworthiness directives, airspace actions, and standard instrument approach procedures. Additional postponements of these regulations will be issued in the next several days to comply with the President's memorandum.

Amendment 125-1A

Amendments of Effective Date of Part 125 and Amendments Adopted in Relation to Part 125

Adopted: February 3, 1981 **Effective: February 3, 1981**

(Published in 46 FR 10903, February 5, 1981)

SUMMARY: This document reestablishes the effective date of new Part 125 and related amendments to February 3, 1981. This change in effective date is necessary since the Office of Management and Budget, in accordance with the President's Memorandum dated January 29, 1981, concerning postponement of pending regulations, authorized the FAA to allow Part 125 to become effective without further delay.

FOR FURTHER INFORMATION CONTACT: Edward P. Faberman, Assistant Chief Counsel for Regulations (AGC-200), Regulations and Enforcement Division, Office of the Chief Counsel, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; telephone: (202) 426-3235.

SUMMARY INFORMATION:

Background

Part 125 was published in the Federal Register on October 9, 1980, (45 FR 67214). That Part, and related amendments to Parts 43, 91, 121, 123, 135, and 145 had an effective date of February 1, 1981. On January 29, 1981, the President issued a memorandum which directed that all agencies, by notice in the Federal Register, postpone for 60 days from January 29, 1981, the effective date of all regulations that had been promulgated in final form and that were scheduled to become effective during that 60 day period. Part 125, and regulations adopted with it, fall within the scope of the President's memorandum.

In accordance with the President's memorandum the effective date of Part 125 was postponed by notice which is published in today's Federal Register. That notice was issued on January 30, 1981, and forwarded to the Federal Register for publication. The Department of Transportation asked the Office of Management and Budget to allow Part 125 to become effective without delay. OMB reviewed that request and advised the Department on February 3, 1981, that Part 125 could become effective in accordance with the President's memorandum. This approval, however, was received by the Department after the Notice postponing the effective date had already been sent to the Government Printing Office by the Office of Federal Register. Therefore, it is necessary to issue this document to establish the effective date for Part 125 as February 3, 1981.

Consistent with this view, I am by this Notice establishing the effective date of Part 125 as February 3, 1981.

Description of Changes

The effective date of Part 125 and of related Amendments 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 is changed to February 3, 1981. In addition, in order to preserve the application and compliance procedure timing, certain dates specified in any of the related amendments listed in the preceding sentence are similarly revised.

Need for Immediate Adoption

Since the Office of Management and Budget approval was too late to stop publication of the January 30 Notice and since the Notice must be rescinded, I find that notice and public procedure are impracticable and contrary to the public interest and good cause exists for making these amendments effective in less than 30 days.

Change of Dates

Accordingly, 14 CFR Chapter 1 is changed as follows:

1. By changing the effective date of Part 125 and Amendment Nos. 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 to read February 3, 1981 in each case.

2. By changing § 125.5 by revising the date "February 1, 1981" in paragraph (a) to read "February 3, 1981" and the dates in paragraph (b) to read "June 1, 1981" and "February 2, 1981" respectively.

(Secs. 307, 313, 601 through 611, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1348, 1354, 1421-1431 and 1502); Sec. 6(c) Department of Transportation Act (49 U.S.C. 1655(c)); Title III, Aviation Safety and Noise Abatement Act of 1979 (94 Stat. 50).

Amendment 125-2

Airplanes; Certification and Operations; Correction

Adopted: April 6, 1981 **Effective: April 30, 1981**

(Published in 46 FR 24409, April 30, 1981)

SUMMARY: This amendment corrects errors made when the final Part 125 regulation was printed in the *Federal Register* (45 FR 67214; October 9, 1980). This amendment is required to ensure that ambiguity resulting from those errors is eliminated.

FOR FURTHER INFORMATION CONTACT: Jean Casciano, Regulatory Projects Branch (AVS-24), Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591; telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION: When Notice of Proposed Rulemaking No. 79-19 was published (44 FR 66324; November 19, 1979), proposed § 125.247(e) read "No person may operate any airplanes unless the installed engines have been maintained in accordance with the overhaul periods recommended by the manufacturer or *a program* approved by the Administrator . . ." (emphasis supplied). However, when the manuscript copy of the final rule was sent to the *Federal Register* for printing, the words "a program" were inadvertently omitted and § 125.247(d)(1) (the subparagraphs were restructured), as submitted and as published, read "The installed engines have been maintained in accordance with the overhaul periods recommended by the manufacturer or approved by the Administrator; and ". The words "a program" are necessary to express the concept that a program approved by the Administrator is a satisfactory alternative to compliance with the overhaul periods recommended by the manufacturer.

In addition, when the final rule was sent to the *Federal Register* for printing, § 125.381(c)(2) stated "Is on final approach segment using a non-precision approach procedure, or . . ." However, when the rule was printed, editorial marks were misread and the final rule was printed to read "Is on final approach using a segment/nonprecision approach procedure, or . . ." It is necessary to correct this ambiguity so the codification document provision is the same as the provision in the amendment signed by the Administrator.

Need for Immediate Adoption

Since this amendment corrects errors, eliminates ambiguity, and imposes no additional burden on any person, I find that notice and public procedure are unnecessary and contrary to the public interest and that good cause exists for making it effective in less than 30 days.

ADOPTION OF THE AMENDMENT

Accordingly, Part 125 of the Federal Aviation Regulations (14 CFR Part 125) is amended effective April 30, 1981.

(Secs. 313, 601 through 610, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1421-1430, and 1502); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c))).

NOTE: The FAA has determined that this document involves a regulation which is not a major rule under Executive Order 12291 or a significant regulation under the DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). Since this regulatory action involves an amendment that corrects an inadvertent omission and an editorial error and does not make a substantive change, the anticipated impact is so minimal that it does not warrant preparation of a regulatory evaluation.

Amendment 125-3

Transport Category Airplanes—Pitot Heat Indication Systems

Adopted: August 7, 1981 **Effective: September 30, 1981**

(Published in 46 FR 43804, August 31, 1981)

SUMMARY: These amendments relieve general aviation operators of transport category airplanes that are operated under Part 91 from the requirement to install pitot heat indication systems to indicate to the flightcrew when the pitot heating system is not operating. The amendments are based on a study which indicates that there have not been any general aviation transport category airplane accidents that could be attributed to a pitot heating system failure. The rule change is also in response to a petition for rulemaking dated January 26, 1979, from the National Business Aircraft Association (NBAA).

FOR FURTHER INFORMATION CONTACT:
Joseph A. Sirkis, Regulatory Projects Branch (AVS-24)
Safety Regulations Staff,
Associate Administrator for Aviation Standards
800 Independence Avenue, SW., Washington, DC 20591;
telephone: (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Notice of Proposed Rulemaking

These amendments are based on Notice of Proposed Rulemaking No. 80-27 (46 FR 76; January 2, 1981). All interested persons were given an opportunity to participate in the making of these amendments, and due consideration was given to all matters presented. These amendments and the reasons for their adoption are the same as those stated in Notice 80-27.

Background of This Rulemaking Proceeding
Amendment 91-148

Section 91.50(a), as adopted by Amendment 91-148 (43 FR 10339; March 13, 1978), provided that after April 12, 1981, with certain exceptions, no person may operate a transport category airplane equipped with a flight instrument pitot heating system unless the airplane is also equipped with an operable pitot heat indication system that complies with § 25.1326. Section 25.1326 requires that the indication provided must incorporate an amber light that is in clear view of a flight crewmember and must be designed to alert the flightcrew if either the pitot heating system is switched "off" or the pitot heating system is switched "on" and any pitot tube heating element is inoperative. All flight operations conducted with transport category airplanes must meet this requirement regardless of the type of operation being conducted.

Petition for Rulemaking by National Business Aircraft Association (NBAA)

On January 26, 1979, the NBAA petitioned the FAA to amend the Federal Aviation Regulations (FAR) to require that only transport category airplanes operated under Part 121, 123, or 135 meet the requirement to have an operable pitot heat indication system.

A summary of the NBAA's petition was published in the *Federal Register* on October 18, 1979 (44 FR 60107), and no comments were received. The FAA included the petition verbatim in Notice 80-27 to provide the public with all statements submitted by the petitioner in support of its petition.

To allow time to consider fully the NBAA petition, in Amendment 91-172 (46 FR 19; January 2, 1981) the FAA suspended the April 12, 1981, compliance date contained in

Amendment 91-148 for operators of transport category airplanes used in general aviation operations under Part 91.

Description of Notice 80-27

Notice 80-27 proposed to exclude general aviation operators of transport category airplanes operating under Part 91 from the operating requirement to install pitot heat indication systems to indicate to the flightcrew when the pitot heating system is not operating. The requirement was to be retained for commercial, air carrier, travel club, and air taxi operators of transport category airplanes. The proposal was in response to a petition from the NBAA which stated, in essence, that the cost of a pitot heat indication system is not justified for general aviation operators.

Notice 80-27 proposed a new section, § 125.122, for the pitot heat indication system requirement in Part 125. This has been changed to § 125.206, which appropriately places the requirement in Subpart F—Instrument and Equipment Requirements.

Discussion of Comments

The FAA received 21 public comments in response to Notice 80-27. A majority of commenters, all of whom operate aircraft under Part 91 only, support the proposal. They agree the proposal would provide financial relief from an unnecessary requirement for general aviation, inasmuch as the cost associated with installing a pitot heat indication system cannot be justified by a proven need for such a warning system. One such commenter states, for example, that in almost 19 years of service experience, his company has never experienced a failure of the pitot heating system on any of the company's aircraft. Similarly, the NBAA contends that existing training in the handling of emergency situations such as instrument failure and recognition of that failure, use of checklists, and cross-checking of instruments provide an equivalent level of safety to that provided by the proposal and that the corporate executive fleet safety record bears this out. The NBAA states that, to the best of its knowledge, there has never been a business aircraft accident attributable to pitot heating system failure.

The FAA, in its study of reports of airplane accidents which have occurred over a period from January 1, 1976, through May 28, 1981, finds no evidence that refutes the NBAA's statement that there is no record of any business or corporate (general aviation) transport category aircraft accident that is attributable to pitot heating system failure. The FAA does not suggest here that general aviation operations are less susceptible than operations conducted under Part 121, 123, 125, or 135 to the problems at which Amendment 91-148 is directed. However, where these operations are concerned, the FAA imposes stricter safety standards than are imposed for general aviation operations under Part 91. Since the operating experience of general aviation operators does not support the need to install a pitot heat indication system, the FAA concludes that the general aviation operator should be relieved of the cost burden associated with installing such a system.

Several commenters oppose the proposal. Some state that the requirement for installing a pitot heat indication system should be retained for Part 91 operations as well as for Part 121, 123, 125, and 135 operations; others state that the requirement should be rescinded for Part 121, 123, 125, and 135 operations as well as for Part 91 operations. Several such commenters state that the requirement for installing a pitot heat indication system should apply to all operations they conduct. They believe that safety standards should be the same for operations conducted under Part 91 as for those conducted under Part 121, 123, 125, or 135, and that the cost of installing a pitot heat indication system would not be prohibitive. An airline pilot's union, in its comment, supports the need for a pitot heat indication system in Part 91 operations because it believes that general aviation transport category airplanes are high-performance aircraft subject to precisely the same hazards as commercial transport category aircraft. This same commenter also implies that the installation costs for such a warning system would not be prohibitive. Another

commenter questions the need for installing a pitot heat indication system in Part 135 operations, stating that such a warning system cannot substitute for professionalism in the flightcrew, while another commenter states that in aircraft operated under Part 125 (which may be operated for compensation or hire), the warning system should be an optional item.

The safety standards should not be the same for Part 91 operations as for operations conducted under Part 121, 123, 125, or 135. As stated earlier, where these operations are concerned, the FAA imposes stricter safety standards. In the absence of a record of any general aviation transport category airplane accident attributable to a pitot heating system failure, the cost of compliance with the pitot heat indication system requirement is not justified for general aviation operations conducted under Part 91. However, since air carriers conduct their operations with the highest level of safety and since Part 125 operators may receive compensation for their operations, the FAA imposes stricter standards on such operators. Therefore, the requirement for installing a pitot heat indication system for operations conducted under Part 121, 123, 125, or 135 is warranted. As stated in Amendment 91-148, the addition of a pitot heat indication system, while not guaranteeing against human error, will provide additional assurance that pilots will become aware as early as possible of a potentially dangerous situation.

One commenter suggests that the proposal be revised to allow the use of alternate indicating systems. This was not proposed in Notice 80-27 and cannot be considered as part of this rulemaking proceeding. Similarly, the commenter's point concerning the need for static port heaters is not part of this rulemaking proceeding.

A general aviation manufacturer's association, in its comment, recommends a rule change that would limit the application of § 25.1326, which requires installation of a pitot heat indication system in transport category airplanes, to airplanes used in commercial, air taxi, air travel club, and air carrier operations. This amendment of § 25.1326 was also proposed by the NBAA in its petition. Such a change was not proposed by the FAA in Notice 80-27. Additionally, no justification was offered by the NBAA for deleting the Part 25 requirement which applies to airplanes whose application for type certificate is made after April 11, 1978. Production of these airplanes will not occur until well in the future. Similarly, the manufacturer's association did not address this aspect in suggesting deletion of this Part 25 requirement.

These amendments do not relieve the operators of those transport category airplanes whose basis for certification includes § 25.1326 from the requirement to install a pitot heat indication system. Section 25.1326 applies to airplanes whose application for type certificate is made after April 11, 1978; however, a number of applications for type certificates were made before that date, and the applicants elected or were required under § 21.17 to include the provisions of § 25.1326 in their basis for certification. Some examples of airplanes required to have a pitot heat indication system as part of their basic design approval include the Boeing 757, the Boeing 767, and the Learjet models 54, 55, and 56.

Regulatory Evaluation

The FAA conducted a regulatory evaluation which is included in the regulatory docket for this action. The FAA determined that there is no cost impact on Part 91, 121, 123, 125, or 135 operators of transport category airplanes and only a minimal to negligible cost impact on the Federal Government. Specifically, this rule provides relief to Part 91 operators of certain transport category airplanes manufactured under a type certificate for which application was made before April 12, 1978, by eliminating the requirement to install pitot heat indication systems and imposes no new requirements on such operators. This rule imposes no new requirements on Part 121, 123, 125, or 135 operators. The requirement imposed by § 91.50 to airplanes operated under Parts 121, 123, 125, and 135 remains unchanged although the requirement for installing a pitot heat indication system is now listed separately in Parts 121, 125, and 135. The Federal Government will incur

minimal to negligible costs in this revision of Part 91, which is considered to be part of the FAA's ongoing program to revise regulations.

Benefits

Implementing this rule provides benefits in terms of cost savings to Part 91 operators of transport category airplanes. It relieves such operators from the requirement to install pitot heat indication systems in their airplanes. During 1982, which is assumed to be the first effective year of the regulation, FAA estimates equipment, maintenance, installation, and downtime cost savings of at least $7.6 million to $10.9 million for operators of approximately 4,700 Part 91 airplanes. Further, cost savings to Part 91 operators of transport category airplanes of $1.0 million to $1.2 million each year during 1983–1985 are expected. Cost savings will be less during 1983 through 1985 than in 1982 because of the projected limited number of new production Part 91-operated transport category airplanes and because installation of the equipment could be performed during airplane assembly, thereby significantly reducing the costs. The FAA notes again that § 25.1326 requires a pitot heat indication system on those airplanes for which a type certificate application was made after April 11, 1978.

Accordingly, the benefits of this regulation outweigh the costs.

ADOPTION OF THE AMENDMENT

Accordingly, Parts 91, 121, 125, and 135 of the Federal Aviation Regulations (CFR Parts 91, 121, 125, and 135) are amended effective September 30, 1981.

(Secs. 313(a), 601, 602, 604, and 607 of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1354(a), 1421, 1422, 1424, and 1427); and Sec. 6(c), of the Department of Transportation Act (49 U.S.C. 1655(c)).

NOTE: This document relieves a substantial segment of the aviation community of a cost burden and does not impose any additional burden on any person. Therefore, the Federal Aviation Administration has determined that this document involves a regulation which is not a major rule under Executive Order 12291 or a significant regulation under the DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "FOR FURTHER INFORMATION CONTACT." It has been determined further that the amendment will not have a significant impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act since it is relieving in nature.

Amendment 125-4

Delay of Part 125 Applicability to Part 129 Operators

Adopted: October 5, 1982 **Effective: October 12, 1982**

(Published in 47 FR 44718, October 12, 1982)

SUMMARY: This amendment to the Federal Aviation Regulations extends the date from January 1, 1983, to September 1, 1984, for foreign air carriers holding Part 129 operations specifications to certificate and comply with Part 125 of the Federal Aviation Regulations. Since the FAA has an active rulemaking project which includes a study of possible changes to Part 129, this action is necessary to avoid requiring foreign air carriers to comply with rules which may be revised by the FAA in the near future.

Comments must be received on or before November 12, 1982.

ADDRESSES: Send comments on the rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-204), Docket No. 23381, 800 Independence Avenue, S.W., Washington, D.C. 20591; or deliver comments in duplicate to: FAA Rules Docket, Room 916, 800 Independence Avenue, S.W., Washington, D.C. 20591. Comments may be examined in the Rules Docket, weekdays except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Gary Perkins, Operations Branch (AFO-820), General Aviation and Commercial Division, Office of Flight Operations, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591, telephone: (202) 426-8194.

SUPPLEMENTARY INFORMATION:

Background

Part 125 includes, in the applicability under § 125.1(e), a deferred compliance date of January 1, 1983, for foreign air carriers holding operations specifications issued under Part 129. As stated in the preamble to the adoption of Part 125 (45 FR 67214; October 9, 1980), this deferred compliance date was included because the agency was considering a regulatory project to revise Part 129, and it would not have been appropriate to subject foreign air carriers to Part 125 requirements until the agency could determine the proper action on Part 129. Various revisions to Part 129 are now under active consideration. A rulemaking project is underway at this time, but the FAA foresees that this project and any subsequent rule changes will not be completed until after the compliance date of January 1, 1983.

Foreign air carriers operating U.S.-registered aircraft have already begun to query the FAA concerning the status of the above-mentioned rulemaking project and the necessity for any action on their part. If the January 1, 1983, compliance date is not changed, these carriers would have to begin certification procedures now to meet that compliance date. Therefore, the agency has decided to extend the compliance date to September 1, 1984.

Since the deferred compliance date of January 1, 1983, in § 125.1(e) applies only to foreign air carriers holding operations specifications issued under Part 129, the extension of that date applies only to those operators. Other foreign citizen operators of U.S.-registered airplanes covered by Part 125 remain subject to that Part.

Need for Immediate Adoption

The FAA is currently considering a rulemaking project to revise Parts 129 and 125 with regard to foreign air carriers. The present date for these carriers to comply with Part 125 for operation of U.S.-registered airplanes will be reached before that rulemaking project is completed. The FAA recognizes an urgent need to amend § 125.1(e) to extend the compliance date and defer imposing Part 125 requirements on these carriers until this

rulemaking action is completed. Not adopting this amendment immediately would unnecessarily impose a burden, both monetarily and in terms of resource utilization, on the FAA and the concerned foreign air carriers. Therefore, I find that notice and public procedure are impracticable and contrary to the public interest. In addition, since this amendment relieves a restriction, I find that good cause exists for making this amendment effective in fewer than 30 days. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address specified above. All communications received on or before November 12, 1982, will be considered by the Administrator, and this amendment may be changed in light of the comments received. All comments received will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

ADOPTION OF THE AMENDMENT

Accordingly, § 125.1(e) of the Federal Aviation Regulations (14 CFR § 125.1(e)) is amended effective October 12, 1982, by removing the date "January 1, 1983," and substituting the date "September 1, 1984," in place thereof.

(Sections 313, 601 through 610, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1421 through 1430, and 1502); Section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).)

NOTE: By extending a compliance date, this amendment allows foreign air carriers regulated by Part 129 to continue operating their U.S.-registered airplanes under that Part. Thus, for the period of the extension, there is no change in their present regulatory status. Therefore, the FAA has determined that this amendment is not major under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). For the reasons discussed above, it also has been determined that the anticipated economic impact is so minimal that no regulatory evaluation is necessary.

Amendment 125-5

Delay of Part 125 Applicability to Part 129 Operators

Adopted: August 20, 1984 Effective: August 31, 1984

(Published in 49 FR 34815, September 1, 1984)

SUMMARY: This amendment to the Federal Aviation Regulations extends the date from September 1, 1984, to February 28, 1986, for foreign air carriers holding Part 129 operations specifications to comply with Part 125 of the Federal Aviation Regulations. Since the FAA has an active rulemaking project which includes a study of possible changes to Part 129, this action is necessary to avoid requiring foreign air carriers to comply with rules which may be revised by the FAA in the near future.

Comments must be received on or before October 1, 1984.

ADDRESSES: Send comments on the rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-204), Docket No. 23381, 800 Independence Avenue, S.W., Washington, D.C. 20591; or deliver comments in duplicate to: FAA Rules Docket, Room 916, 800 Independence Avenue, S.W., Washington, D.C. 20591. Comments may be examined in the Rules Docket, weekdays except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Ron Myres, Project Development Branch, (AFO-850), General Aviation and Commercial Division, Office of Flight Operations, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591, telephone: (202) 426-8150.

SUPPLEMENTARY INFORMATION:

Background

Part 125 includes, in the applicability under § 125.1(e), a deferred compliance date of September 1, 1984, for foreign air carriers holding operations specifications issued under Part 129. As stated in the preamble to the adoption of Part 125 (45 FR 67214; October 9, 1980), this deferred compliance date was included because the agency was considering a regulatory project to revise Part 129, and it would not have been appropriate to subject foreign air carriers to Part 125 requirements until the agency could determine the proper action on Part 129. Various revisions to Part 129 are now under active consideration. A rulemaking project is underway at this time, but the FAA foresees that this project and any subsequent rule changes will not be completed until after the compliance date of September 1, 1984.

The FAA is also taking into consideration that proposal of revisions to Part 129 will entail a 120-day comment period to afford all affected persons an opportunity to express their views. With this in mind, the agency has decided to extend the compliance date to February 28, 1986.

Since the deferred compliance date of September 1, 1984, in § 125.1(e) applies only to foreign air carriers holding operations specifications issued under Part 129, the extension of that date applies only to those operators. Other foreign citizen operators of U.S.-registered airplanes covered by Part 125 remain subject to that Part.

Need for Immediate Adoption

The FAA is currently considering a rulemaking project to revise Parts 129 and 125 with regard to foreign air carriers. The present date for these carriers to comply with Part 125 for operation of U.S.-registered airplanes will be reached before that rulemaking project is completed. The FAA recognizes an urgent need to amend § 125.1(e) to extend the compliance date and defer imposing Part 125 requirements on these carriers until this rulemaking action is completed. Not adopting this amendment immediately would unnecessarily impose a burden, both monetarily and in terms of resource utilization, on the

FAA and the concerned foreign air carriers. Therefore, I find that notice and public procedure are impracticable and contrary to the public interest. In addition, since this amendment relieves restriction, I find that good cause exists for making this amendment effective in fewer than 30 days. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address specified above. All communications received on or before October 1, 1984, will be considered by the Administrator, and this amendment may be changed in light of the comments received. All comments received will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

CONCLUSION

By extending a compliance date, this amendment allows foreign air carriers regulated by Part 129 to continue operating their U.S.-registered airplanes under that part. Thus, for the period of the extension, there is no change in their present regulatory status. Therefore, the FAA has determined that this amendment is not major under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). For the reasons discussed above, it also has been determined that the anticipated economic impact is so minimal that no regulatory evaluation is necessary.

ADOPTION OF THE AMENDMENT

Part 125—Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More.

Accordingly, § 125.1(e) of the Federal Aviation Regulations (14 CFR § 125.1(e)) is amended effective August 31, 1984, by removing the date "September 1, 1984," and substituting the date "February 28, 1986," in place thereof.

(Sections 313, 601 through 610, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1421 through 1430, and 1502); 49 U.S.C. 106(g) (Revised P.L. 97-449, January 21, 1983); and 14 CFR 11.45).

Amendment 125-6

Delay of Part 125 Applicability of Part 129 Operators

Adopted: December 31, 1985 Effective: February 28,1986

(Published in 51 FR 873, January 8,, 1986)

SUMMARY: This amendment to the Federal Aviation Regulations extends the date from February 28, 1986, to February 28, 1987, for foreign air carriers holding Part 129 operations specifications to comply with Part 125 of the Federal Aviation Regulations. Since the FAA has an active rulemaking project which includes a study of changes to Part 129, this action is necessary to avoid requiring foreign air carriers to comply with rules which may be revised by the FAA in the near future.

Comments must be received on or before February 10, 1986.

ADDRESSES: Send comments on the rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-204), Docket No. 23381, 800 Independence Avenue, S.W., Washington, D.C. 20591; or deliver comments in duplicate to: FAA Rules Docket, Room 916, 800 Independence Avenue, S.W., Washington, D.C. 20591. Comments may be examined in the the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Tom Stuckey, Project Development Branch (AFS-850), General Aviation and Commerical Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, telephone: (202) 426-8150.

SUPPLEMENTARY INFORMATION:

Background

Part 125 includes, in the applicability under § 125.1(e), a deferred compliance date of February 28, 1986, for foreign air carriers holding operations specifications issued under Part 129. As stated in the preamble to the adoption of Part 125 (45 FR 67214; October 9, 1980), this deferred compliance date was included because the agency was considering a regulatory project to revise Part 129, and it would not have been appropriate to subject foreign air carriers to Part 125 requirements until the agency could determine the proper action on Part 129. Various revisions to Part 129 are now under active consideration. A rulemaking project is underway at this time, but the FAA foresees that this project and any subsequent rule changes will not be completed until after the compliance date of Feburary 28, 1986.

The FAA is also taking into consideration that proposal of revisions to Part 129 will entail a 120-day comment period to afford all affected persons an opportunity to express their views. With this in mind, the agency has decided to extend the compliance date to February 28, 1987.

Since the deferred compliance date of February 28, 1986, in § 125.1(e) applies only to foreign air carriers holding operations specifications issued under Part 129, the extension of the date applies only to those operators. Other foreign citizen operators of U.S.-registered airplanes covered by Part 125 remain subject to that Part.

Need for Immediate Adoption

The FAA is currently considering a rulemaking project to revise Parts 129 and 125 with regard to foreign air carriers. The present date for these carriers to comply with Part 125 for operation of U.S.-registered airplanes will be reached before that rulemaking project is completed. The FAA recognizes an urgent need to amend § 125.1(e) to extend the compliance date and defer imposing Part 125 requirements on these carriers until this rulemaking action is completed. Not adopting this amendment immediately would unnecessarily impose a burden, both monetarily and in terms of resource utilization, on the FAA and the concerned foreign air carriers. Therefore, I find that notice and public procedure are impracticable and contrary to the public interest. However, interested

persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address specified above. All communications received on or before February 10, 1986, will be considered by the Administrator, and this amendment may be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

Conclusion

By extending a compliance date, this amendment allows foreign air carriers regulated by Part 129 to continue operating their U.S.-registered airplanes under that Part. Thus, for the period of the extension, there is no change in their present regulatory status. There, the FAA has determined that this amendment is not major under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034., February 26, 1979). For the reasons discussed above, it also has been determined that the anticipated economic impact is so minimal that no regulatory evaluation is necessary.

ADOPTION OF THE AMENDMENT:

Part 125—Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More.

Accordingly, § 125.1(e) of the Federal Aviation Regulations (14 CFR § 125.1(e)) is amended effective February 28, 1986, by removing the date "February 28, 1986," and substituting the date "February 28, 1987," in place thereof.

Authority: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

Amendment 125-7

Delay of Part 125 Applicability of Part 129 Operators

Adopted: March 2, 1987 **Effective: March 4, 1987**

(Published in 52 FR 6956, March 6, 1987)

SUMMARY: This amendment to the Federal Aviation Regulations extends the date from February 28, 1987, to February 29, 1988, for foreign air carriers holding Part 129 operations specifications to comply with Part 125 of the Federal Aviation Regulations. Since the FAA has an active rulemaking project which includes a study of changes to Part 129, this action is necessary to avoid requiring foreign air carriers to comply with rules which may be revised by the FAA in the near future.

Comments must be received on or before April 6, 1987.

ADDRESS: Send comments on the rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-204), Docket No. 23341, 800 Independence Avenue, SW., Washington, DC 20591; or deliver comments in duplicate to: FAA Rules Docket, Room 916, 800 Independence Avenue, SW., Washington, DC. Comments may be examined in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Thomas E. Stuckey, Manager, Project Development Branch (AFS-850), General Aviation and Commercial Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267-8150.

SUPPLEMENTARY INFORMATION:

BACKGROUND

Part 125 includes, in the applicability under § 125.1(e), a deferred compliance date of February 28, 1987, for foreign air carriers holding operations specifications issued under Part 129. As stated in the preamble to the adoption of Part 125 (45 FR 67214; October 9, 1980), this deferred compliance date was included because the agency was considering a regulatory project to revise part 129, and it would not have been appropriate to subject foreign air carriers to Part 125 requirements until the agency could determine the proper action on Part 129. Various revisions to Part 129 have been proposed in Notice of Proposed Rulemaking 85-24 (50 FR 50588; December 10, 1985). The FAA is in the final stage of determining what, if any, rule changes should be made, but it will not be possible to complete this work until after the compliance date of February 28, 1987. With this in mind, the agency has decided to extend the compliance date to February 29, 1988.

Since the deferred compliance date of February 28, 1987, in § 125.1(e) applies only to foreign air carriers holding operations specifications issued under Part 129, the extension of that date applies only to those operators. Other foreign citizen operators of U.S.-registered airplanes covered by Part 125 remain subject to that part.

NEED FOR IMMEDIATE ADOPTION

The FAA is currently considering a rulemaking project to revise Parts 129 and 125 with regard to foreign air carriers. The present date for these carriers to comply with Part 125 for operation of U.S.-registered airplanes will be reached before that rulemaking project is completed. The FAA recognizes an urgent need to amend § 125.1(e) to extend the compliance date and defer imposing Part 125 requirements on those carriers until this rulemaking action is completed. Not adopting this amendment immediately would unnecessarily impose a burden, both monetarily and in terms of resource utilization, on the FAA and the concerned foreign air carriers. Therefore, I find that notice and public procedure are impracticable and contrary to the public interest. In addition, since this amendment relieves a restriction, I find that good cause exists for making this amendment effective in less than 30 days. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address specified above. All communications received on or before April 6, 1987, will be considered by the Administrator, and this amendment may be changed in light of the comments received. All comments received will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

CONCLUSION

By extending a compliance date, this amendment allows foreign air carriers regulated by Part 129 to continue operating their U.S.-registered airplanes under that part. Thus, for the period of the extension, there is no change in their present regulatory status. Therefore, the FAA has determined that this amendment is not major under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). For the reasons discussed above, it also has been determined that the anticipated economic impact is so minimal that no regulatory evaluation is necessary.

ADOPTION OF THE AMENDMENT

Accordingly, § 125.1(e) of the Federal Aviation Regulation (14 CFR § 125.1(e)) is amended, effective March 4, 1987, by removing the date "February 28, 1987" and substituting the date "February 29, 1988," in place thereof.

The authority citation for Part 125 continues to read as follows:

AUTHORITY: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

Amendment 125-8

Flight Recorders and Cockpit Voice Recorders

Adopted: March 18, 1987 **Effective: May 26, 1987**

(Published in 52 FR 9822, March 25, 1987)

SUMMARY: This amendment requires improved (digital) flight recorders with additional data parameters for airplanes type certificated before 1969 and operated in Part 121 operations. Review of National Transportation Safety Board accident/incident files for January 1983 to February 1986 revealed the high failure rate of the metal foil flight recorders. The data revealed that 37 recorders (48 percent) had one or more malfunctioning parameters preceding the accident/incident preventing the recording or readout of pertinent data. As a result, post-accident flight recorder examination cannot be relied upon to provide accident investigators with sufficient information to accurately assess the causal interrelationship between man, machine, and environment. The requirement of a digital flight recorder with additional data parameters is deemed the minimum standard necessary to ensure that all of the underlying causal factors of an accident are identified. The amendment also requires cockpit voice recorders on newly manufactured multiengine, turbine-powered airplanes certificated to carry six or more passengers, requiring two pilots by type certification or operating rules for those operations conducted under Part 135. The amendment also specifies that for those operators conducting operations under Part 91 and Part 125 that have installed approved cockpit voice recorders, the Administrator will not use the record in any civil penalty or certificate action. These amendments were based on recommendations from a study conducted by Trans Systems Corporation and a number of safety recommendations by the National Transportation Safety Board.

FOR FURTHER INFORMATION CONTACT: Frank Rock, Federal Aviation Administration, Office of Airworthiness, Aircraft Engineering Division, Technical Analysis Branch, AWS-120, 800 Independence Avenue, S.W., Washington, D.C. 20591; telephone (202) 267-9567.

SUPPLEMENTARY INFORMATION:

Regulatory History

These amendments are based on Notice of Proposed Rulemaking (NPRM) No. 85-1, published in the *Federal Register* on January 8, 1985 (50 FR 949). All comments received in response to NPRM No. 85-1 were considered in adopting these amendments.

Background

For those operations conducted under Parts 91 and 125 of the Federal Aviation Regulations (FAR), there are no requirements that either a flight recorder or a cockpit voice recorder (CVR) be installed. However, in the interest of safety, the Federal Aviation Administration (FAA) has always encouraged the installation of approved flight recorders and approved cockpit voice recorders in airplanes used in those operations.

Section 121.343 of the FAR requires operators to equip each turbine-powered airplane and each airplane certificated for operation above 25,000 feet with an approved flight recorder. For airplanes having an original type certificate issued through September 30, 1969, the flight recorder parameters must include time, altitude, airspeed, vertical acceleration, heading, and radio transmission keying. Airplanes having an original type certificate issued after September 30, 1969, are required to have additional flight recorder parameters indicating pitch attitude, roll attitude, side-slip angle or lateral acceleration, pitch-trim position, control column or pitch control surface position, control wheel or lateral control surface position, rudder pedal or yaw control surface position, thrust of each engine, position of each thrust reverser, trailing edge flap, or cockpit flap or cockpit flap control position.

The CVR provisions for Part 121 operators require a CVR for each large turbine-powered or large pressurized airplane with four reciprocating engines.

Part 135 does not require operators to have flight recorders but does require turbojet airplanes configured to carry ten passengers or more to have a cockpit voice recorder installed.

Since these provisions were adopted, there has been a dramatic change in the air carrier industry. Deregulation has contributed to that change by allowing existing Part 121 carriers to pull out of short-to-medium-range markets, thereby creating a demand being filled by a rapidly expanding commuter airline industry. To meet the equipment needs of the expanding commuter airline industry, manufacturers have developed new fuel-efficient airplanes, including derivatives of airplanes type certificated through September 30, 1969. These airplanes have an expected lifespan well into the next century.

The past rule allowed these derivative airplanes to operate with flight recorder technology that dates back to the 1950's. In the past, cockpit voice recorders and flight recorders were not required of the commuter airline industry based on the premise that the level of passenger service was not sufficient to justify installing these recorders. Increased operation of the short-to-medium-range airplanes by the commuter airline industry, however, has placed them actuarially in a more severe operational environment than airplanes type certificated through September 30, 1969, creating the need for additional data collection.

Discussion

This amendment revises a § 91.35 and adds a new § 125.202 that specifies that the Administrator will not use the cockpit voice recorder record in any civil penalty or certificate action. The purpose is to encourage operators to voluntarily install cockpit voice recorders in airplanes that are used in those operations where they are not required. The installed equipment must be approved and must continue to meet the airworthiness requirements under which the airplane is type certificated and operated.

This amendment substantively revises § § 121.343 and 135.151. For operations conducted under Part 121, this rule requires retrofitting all airplanes type certificated through September 30, 1969 (currently using a six-parameter foil-type flight recorder), with a six-parameter digital flight recorder within 2 years from the effective date of the amendment. In addition, these flight recorders must be upgraded to 11-parameter digital flight recorders within 7 years after the effective date of this amendment. The 11 parameters consist of those currently required plus the following: (1) pitch attitude; (2) roll attitude; (3) longitudinal acceleration; (4) control column or pitch control surface position; and (5) thrust of each engine. They are required to perform within the ranges, accuracies, and recording intervals specified in Appendix B of Part 121.

All newly manufactured airplanes having an original type certificate issued through September 30, 1969, are required to have 17-parameter digital flight recorders installed after 2 years from the effective date of this amendment.

The requirements for airplanes type certificated after September 30, 1969, do not change except for the substitution of longitudinal acceleration for lateral acceleration.

For those operations conducted under Part 135, the amendment requires the installation of a CVR for all multiengine, turbine-powered airplanes certificated to carry six or more passengers and requiring two pilots by certification or operating rules, that are newly manufactured 2 years from the effective date of this amendment.

"Manufactured" means when the airplane inspection acceptance records reflect that the airplane is complete and meets the FAA-approved type design data. An airplane manufactured and then placed into storage prior to sale is considered manufactured on the date it is completed prior to being placed in storage.

Discussion of Comments

In response to NPRM No. 85-1, the FAA received comments from 29 interested persons. The majority of the comments received express opposition to the proposals based upon the costs involved in complying with the proposed requirements. More specifically, most of the opposition is directed to the digital flight data recorder proposals.

The proposals in NPRM No. 85-1 address three issues: (1) recorder information to be used only for accident investigation purposes; (2) digital flight data recorders in specific airplanes operated under Part 121 of the FAR; and (3) cockpit voice recorders in specific newly manufactured airplanes operated under Part 135 of the FAR. For discussion and analysis purposes, each issue will be addressed separately.

In its comments on NPRM No. 85-1, the National Transportation Safety Board (NTSB) states that the FAA has not entirely satisfied the intent of all its safety recommendations made to the FAA concerning enhancement of flight recorder standards required to provide adequate data for accident and incident investigation purposes and identifies six specific shortcomings. All the issues raised by the NTSB in its comments to NPRM No. 85-1 had been forwarded previously to the FAA as NTSB safety recommendations. These issues were considered in the development of the NPRM and have been addressed by FAA formal responses to the recommendations, the NPRM, or the preamble to this rule.

Since 1967, the NTSB has issued a total of 53 recommendations regarding CVR's and flight recorders. Of this total, 38 recommendations were forwarded to the FAA. The remaining 15 recommendations were issued to industry groups such as U.S. air carriers, the Air Line Pilots Association, the Allied Pilots Association, airplane and rotorcraft manufacturers, etc. Of the 15 industry recommendations, 5 remain open (A-82-101 through -105).

Of the 38 NTSB recommendations issued to the FAA, 26 recommendations are "CLOSED" through FAA/NTSB staff coordination and 12 recommendations remain in an "OPEN" status. The FAA is continuing to address these remaining 12 "OPEN" recommendations. The following is a summary of the "OPEN" recommendations that are mentioned in the NTSB's comments to the docket.

Recommendations A-82-067 and -108 recommend requirements for improved CVR's and flight recorders for rotorcraft and are being dealt with under a separate rulemaking action.

Recommendation A-82-106 recommends the development of a technical standard order (TSO) for CVR's and flight recorders. Proposed TSO-C111, which contains standards for CVR and flight recorders and combined CVR's/flight recorders, was published in the *Federal Register* on April 12, 1985. The final version of the TSO is presently undergoing internal FAA coordination prior to issuance.

Recommendations A-82-064 through -066 recommend that flight recorders currently required on fixed-wing aircraft operated under Part 121 be improved and that such aircraft manufactured after a certain date be equipped for flight recorders with additional parameters.

Recommendations A-82-107 and -109 through -111 recommend that turbojet fixed-wing aircraft certificated for six or more passengers not now required to have CVR's or flight recorders be required to have CVR's and flight recorders with additional parameters.

In its comments to the docket regarding Recommendations A-82-064 through -066, the NTSB requested that the FAA reconsider its action on Recommendation A-82-066 and require 32 parameters for flight recorders on newly manufactured fixed-wing aircraft operated under Part 121. The FAA has determined that an increase in the required parameters to 17 represents an appropriate balance of costs and benefits.

In its comments to the docket on Recommendations A-82-107 and -109 through -111, the NTSB acknowledged that the FAA has satisfied its recommendation with respect to CVR requirements for aircraft operating under Part 135. The NTSB urged the FAA to require flight recorders for all multiengine turbine-powered aircraft operated under Part 135. The FAA agrees with the NTSB that requiring flight recorders on multiengine turbine-powered aircraft operated under Part 135 would provide helpful accident investigation information. However, the FAA continues to believe that the benefits of such regulation would not be commensurate with the associated costs.

In its comments to the docket, the NTSB states that the rule does not provide flexibility to accommodate advancing technology. The FAA agrees that changes in aeronautical technology may at some future date require changes to this rule. However, to issue a rule that includes the degree of flexibility necessary to accommodate future technology that is not presently defined is impracticable. When new design features are identified, the FAA can and will evaluate them during development of the type certification basis and take whatever actions are necessary to maintain the required safety level. If additional parameters or interfaces between electronic systems call for special requirements, they will be issued as appropriate. Consistent with rulemaking policy and as experience is gained with such future novel technologies, consideration will be given to revising the appropriate rules. In the new, fly-by-wire aircraft control system design, the one-to-one correlation from crew input to the resulting control system response does not exist. That, and other new design features, may require the FAA to propose and adopt additional parameters to be recorded, over those currently required by the operating rules.

The NTSB continues to urge that the FAA initiate further rulemaking to require flight recorders in multiengine, turbine-powered, fixed-wing airplanes operated under Part 91 or 125. A careful review of the benefits required to offset the cost of requiring flight recorders in the class of airplanes recommended by the NTSB operating under Part 91 or 125 shows that the anticipated benefits will not support such a requirement. The rule does encourage the installation of such equipment by stating that flight recorder records will not be used by the Administrator in any civil penalty or certificate action.

In its comments to the docket, the NTSB stated that it was disturbed that the FAA has not taken the initiative to propose rulemaking consistent with the standards recently adopted by the International Civil Aviation Organization (ICAO). This amendment is consistent with the recent Amendment 17 to ICAO Annex 6, Part I. The NTSB, in its comments, intermingles ICAO "requirements" and ICAO "recommendations." Requirements are binding on the ICAO member states, while recommendations are not. This amendment is in full agreement with the ICAO requirements in Section 6.3 of Annex 6 and in many respects is in agreement with the ICAO recommendations in that section. Attachment D to ICAO Annex 6, Part I, contains detailed flight recorder guidance to member states. In that attachment, ICAO recommends the 32-parameter flight recorders for certain types of airplanes. The FAA agrees with both ICAO and the NTSB that more data is always preferable and also agrees with the ICAO position that the increased data parameters be recommendations and not required parameters. The FAA believes that the parameters specified in this amendment are sufficient to identify accident probable cause and that the additional parameters (up to 32) have not been shown to be cost beneficial.

Recorder Information for Accident Investigation

One commenter supports the proposed amendments to §§ 91.35 and 125.202. A second commenter opposes the amendments, contending that the FAA should use the data as necessary to improve piloting skills. The FAA does not agree that the Administrator should use the cockpit voice recorder record in any civil penalty or certificate action. As stated in the notice, the purpose is to encourage operators to voluntarily install cockpit voice recorders in airplanes where they are not required. The information from the record is to determine the cause of the accident and not to place blame. Improvement of piloting skills can be obtained by current requirements, such as the biennial flight checks.

Digital Flight Data Recorder

The FAA received seven comments supporting the notice as it relates to the digital flight data recorder proposals.

One commenter contends that any airline retrofit requirement can be satisfied by equipment currently in production and agrees with the FAA's estimates of equipment costs. This commenter asserts that his estimate of maintenance cost savings to airlines which replace foil recorders with digital flight recorders reflects a savings of $600,000 annually based on a 100-airplane fleet.

Another commenter agrees with the requirement to replace metal foil-type recorders with digital types because accident investigation would be simplified and accomplished with greater accuracy but expresses concern that the 2-year period for replacement of existing metal foil-type recorders with digital types may not be realistic. The commenter asserts that the assumption was made that the new digital recorders would be directly interchangeable with existing foil-type recorders in all installations. Although many metal foil-type recorders in service are packaged in rectangular (standard ½ Air Transport Rated (ATR) long) containers, almost 1,400 Lockheed Model 109C metal foil-type recorders packaged in a spherical container have been delivered to customers, and many are still in service today. This commenter also recommends that the two-phase (2-year/7-year) plan be replaced with a single-phase program for incorporation of the 11 parameter recorder and that the time limit for completion be compatible with existing airline maintenance cycles. The FAA recognizes that the Lockheed Model 109C recorder is configured differently from the standard ½ ATR long container but still believes that the 2-year phase-in period, with proper planning, is sufficient to reconfigure the mounting rack for installation of the new recorder.

Two commenters, while supporting the proposed rule, believe that the requirements should be further expanded to maximize the information available from accident investigations and contend there is sufficient justification to require all airplanes operated under Part 121 and type certificated through September 30, 1969, to be upgraded to the 17-parameter digital recorder within 2 years from the effective date of the amendment. The FAA agrees that 17 parameters would derive more information

from the accident. However, the 11 parameters required for the aircraft type-certificated through September 30, 1969, via the 2-step program will enhance the accident data available to investigators with minimum cost and out-of-service time for the airplane. The FAA does not believe that the additional 6 parameters will provide the safety benefit necessary to offset the additional cost. Both commenters are of the opinion that all airplanes involved in Part 135 operations should be required to carry the digital flight recorders within 2 years from the adoption of the amendment. One of the commenters also questions the use of a single parameter for measuring engine thrust and believes a more accurate method is to measure the N_1 speed and fuel flow for each engine. The FAA considers these issues to be outside the scope of this current rulemaking action.

One other commenter considers the 17-parameter digital recorder as being too limited and not consistent with recently adopted International Civil Aviation Organization (ICAO) requirements (32 parameters) applicable to airplanes over 60,000 pounds. The FAA evaluated these issues in the Trans Systems study while preparing the notice and concluded that based on the information available at that time, the proposals were the most cost beneficial in terms of accident prevention through accident investigations. It should also be pointed out that the final ICAO document addresses only new certificates of airworthiness issued after 1989. The comment is outside the scope of the notice, and there is insufficient justification by the commenter to issue a supplemental notice that addresses the recent ICAO standards. The FAA concludes that the existing air carrier fleet of 2,000 plus transport category airplanes do need the new digital type 11-parameter recorder, and this regulatory action should proceed.

Another commenter agrees with the proposals and believes they are necessary to ensure that adequate data is available for accident investigations. The commenter contends that in the affected airplanes, there will be adequate room, and little weight penalty for the digital flight recorder to be installed and serviced without difficulty. The FAA agrees with these comments.

One commenter states that the requirement for converting to a 6-parameter digital recorder should be deleted as it is unlikely to enhance accident investigation to any extent and recommends requiring the 11-parameter recorder in 7 years. The FAA does not agree because adequate time has been allotted for foil-type recorders to be replaced and then expanded to the 11-parameter recorder without undue hardship on the airline industry. Research of the National Transportation Safety Board (NTSB) records indicates that 48 percent of the recorders recovered from accidents or incidents were not functioning. The foil-type recorder would likely increase in failure rate over the 7-year period, resulting in increased inspections, decreased time between overhaul, and possible increase in FAR maintenance violations, as well as not having the data available in the event of an accident or incident. There is a definite need to replace the foil recorders as soon as possible.

In addition to the above, the FAA received 18 responses to the notice expressing opposition to the digital flight recorder proposals on the basis of the economic impact of complying with the proposed requirements. Five commenters provided estimated cost figures for retrofitting their CV-580 turbopropeller airplanes to comply with the proposed requirements. These estimates ranged from $14,000 to $50,000 per airplane modification. Estimated cost figures that were provided for other models of airplanes came within the above low and high estimates per airplane modification. In addition, one commenter notes that the FAA estimated costs in the notice did not consider the loss of value on currently owned flight recorders, and this commenter estimates this value at $6,000 per recorder. With the loss of $6,000 per recorder added to his estimate, this brings the total estimated cost to approximately $9,500 below the average of the low and high estimates above. Another commenter states that he has observed a price increase per flight recorder of approximately $5,000 to $6,000 since the issuance of NPRM No. 85-1. To properly respond to these comments, the FAA has prepared a detailed cost estimate using the latest available information in its Regulatory Evaluation, and the FAA considers these costs the most realistic in determining the cost of compliance with the final rule.

The NTSB suggests the addition of longitudinal acceleration as a parameter. The NTSB contends that longitudinal acceleration is vital for determining the effect of wind shear, braking, and airplane performance and is a much more significant parameter than some others presently recorded. The NTSB is responsible for determining the probable cause of and contributing factors to an accident and is the prime user of the flight recorder data. The FAA agrees with the NTSB that the longitudinal accelerometer is necessary in identifying the contributing factors to an accident or incident, and has changed the requirements for the 11-parameter recorder by substituting longitudinal acceleration for pitch trim for the post-September 30, 1969, certificated airplanes. In addition, the FAA has substituted

longitudinal acceleration in place of lateral acceleration for newly manufactured airplanes. The FAA has reviewed type design data for airplanes affected and finds that other than the reconnection of wiring at the tri-axis accelerometers in the post-September 30, 1969 airplane, and the substitution of a longitudinal accelerometer for a pitch trim synchro or a potentiometer in the 11-parameter airplane type certificated through September 30, 1969, these changes are not significant.

Another commenter opposes the digital flight recorder proposal but does not operate any airplanes that require modification to comply with the proposal. This commenter did not provide any information or data to support this opposition. The FAA does not agree with this commenter.

One commenter contends the foil-type flight recorders are satisfactory for the older turbopropeller-driven airplanes because their design and operating environment is sufficiently different from that of turbojet-powered airplanes. The FAA does not agree that the foil-type recorder is adequate in the current accident investigation environment because of the inaccuracies that can occur between the routine maintenance times and the operations check before flight. A recent review of NTSB accident files has found the inservice failure rate of the foil recorders to be unacceptable.

Several commenters state that many of the older affected airplanes will likely be retired shortly after the anticipated effective date in early 1987. The FAA does not agree that the older airplanes should be exempted because of a supposed early retirement from service. Certain operators may retire their affected airplanes from their fleets, but these airplanes most likely will be in service with other operators, and the requirements will continue to be applicable. Because the airplanes comply with the new rules, the operator has a more marketable and valuable airplane at the time the airplane is placed on the market. The FAA does agree that an airplane in service for a considerable length of time may be considered to have a low probability of operational and mechanical "surprises." However, unanticipated events such as fatigue may still occur and human factor information is relevant in accident investigations involving old and new airplanes alike. A digital flight recorder as an investigative tool will provide insight into these issues.

One commenter, an all-cargo carrier operating under Part 121 with nine CV-580 airplanes, states that the additional cost to comply with the proposed requirements would create a serious financial hardship on the company. This commenter contends that: the recent accident data for CV-580 airplanes does not justify any need to change the type of flight recorder in use; the CV-580 airplane design and operating environment has not changed in the past 25 years; and, the additional parameters and significant additional cost have not been justified on a cost versus flight safety benefit basis. Furthermore, this commenter contends that the cost to retrofit the digital flight recorder in his CV-580 airplanes could easily run as high as $450,000. The FAA recognizes that this commenter's contention of $50,000 per airplane for complying with the proposed requirement would be significant. However, no information or data was provided to show how this figure was derived. Most prudent operators will not incur these extremely high costs to comply with this final rule. The basis for this conclusion is explained in the section of the regulatory evaluation discussing FAA's response to these comments. A pilot-induced accident can occur any time with any airplane, and the accident history of a specific airplane type should not be a basis for exclusion from this regulation. Every accident must be evaluated to determine the probable cause and related events, and these types of airplanes are operated in sufficient numbers in passenger service to require the same accident investigation tools as other Part 121 airplanes.

One commenter recommends that airplanes type certificated prior to January 1, 1958, be exempt from the proposed requirements. The FAA does not agree with this recommendation, because every accident must be adequately investigated to determine the probable cause and identify actions to prevent accidents of that nature.

One commenter contends that the estimated nonrecurring cost for the proposed 2-phase retrofit of digital flight recorders on its association's member fleet is $49.5 million for 2,000 airplanes, not counting cash loss due to out-of-service time, and contends that the FAA's cost estimates are inconsistent. Furthermore, this commenter asserts that the FAA's stated basis for the proposed rule is based upon erroneous information and speculative estimates of future "unknown hazards" that would be identified by the expanded parameter digital recorders; that the FAA did not present any data that conclusively shows that the probable cause of any U.S. air carrier accident could not be determined because of the use of 6-parameter foil-type recorders; and that properly maintained 6-parameter flight recorders have not served the industry and Government well in developing accident prevention measures.

This commenter recommends the notice be withdrawn because of the lack of adequate justification presented by the FAA. In addition, this commenter recommends that if the FAA decides to require the improved flight recorders regardless of the airline safety record, a single-step program that provides at least 7 years for accomplishment would minimize the impact on the airlines. Furthermore, the FAA should reevaluate its cost versus benefit estimates using economic data presented in this response and by other commenters. The FAA has reevaluated the cost data, and the Regulatory Evaluation reflects these changes. With respect to the basis for this rule change, experience has shown that unexpected accident scenarios and unusual combinations of circumstances will occur.

Another commenter, while not opposing the proposal, recommends deleting the 6-parameter step in the program and recommends going directly to the 11-parameter digital flight recorder requirements, because the 2-year implementation period for retrofit is considered unrealistic. This would permit installations to coincide with maintenance schedules. This commenter also states that the notice assumed that foil-type recorders are apparently interchangeable with digital types in all cases and states that the digital flight recorders and the spherical configured foil-type are not, in fact, directly interchangeable as assumed. As previously stated, the FAA does not agree that the implementation program should be lengthened or that the 2-year implementation program is unrealistic. This commenter presented no information to support this assertion. The FAA has reevaluated the time frames for implementation against the availability of modification kits and/or digital recorders necessary for complying with these requirements and continues to find them achievable and realistic. Further, a slight additional cost for replacing the spherical foil recorder with the rectangular digital recorder is reflected in the revised Regulatory Evaluation.

One commenter recommends that § 121.343(c)(6) and (d)(6) be changed to indicate that radio communication either to or from Air Traffic Control (ATC) is acceptable. The FAA intent was to record the airplane transmitter keying which would be *to* ATC. The rule has been changed accordingly. This commenter also recommends that the word "large" be added before the words "turbine engine powered" in § 121.343(b) to clarify that the requirement applies only to large airplanes. The FAA does not agree this change is necessary, because all airplanes operated under Part 121 must be type certificated in the transport category and the FAA is not aware of any small airplanes, weighing less than 12,500 pounds maximum certificated takeoff weight, being operated under Part 121. If small airplanes do in the future operate under Part 121, the FAA sees no reason to treat them differently from large airplanes.

Another commenter suggests replacement of the foil-type recorders with digital types on attrition basis and contends that the price increase of 100 percent in the last 3 years for the foil medium will achieve this objective. The FAA does not agree, because there is no assurance of attrition as suggested, and no assurance that digital flight recorders will be installed within a reasonable period of time. Furthermore, the FAA has no way of controlling flight recorder prices.

These amendments are based on a number of NTSB recommendations and a study conducted by Trans Systems Corporation, completed in May 1983 for the FAA Office of Aviation Safety, entitled "Cockpit Voice and Flight Data Recorder Evaluation." The study evaluated a number of CVR/flight recorder equipment requirements and options, one of which was the adoption of all NTSB recommendations. The Trans Systems study is available in the Public Docket for review. Copies of the FAA replies to NTSB safety recommendations concerning CVR's/flight recorders are available from the FAA Office of Aviation Safety.

Cockpit Voice Recorder

The FAA received 16 comments in response to the cockpit voice recorder proposal, with 9 commenters opposing the proposal and 7 commenters expressing support.

Three commenters contend that the requirements should apply only to those turbined-powered airplanes with a seating configuration of ten or more, excluding pilot seats. One commenter states that no rationale is given to reduce the number to six and that, historically, the dividing line has been ten passenger seats. The FAA does not agre with the increase to ten because of the large number of small airplanes that operate with between six and nine passengers and that are required by Part 135 to have two pilots for conducting Instrument Flight Rules operations with those airplanes.

The NTSB's recommendation, which was used as the basis of the Trans Systems Corporation study, was about the number of accidents involving six-passenger turbine-powered, multiengine airplanes in air taxi and corporate/executive operations in which the accidents circumstances remain unknown.

One commenter asserts that the increased fuel consumption to carry these recorders should be considered in the economic evaluation. The FAA agrees that the increased fuel cost should be added in the analysis, and the economic evaluation addresses the increase.

Another commenter contends that the purpose of cockpit voice recorders is to fix the blame for an accident or incident. The FAA does not agree because the purpose of the recorder is to determine the probable cause of the accident, and this should not be construed to mean "fix the blame." The same commenter asserts that some 80 percent of all accidents are caused by pilot error but provides no basis for this assertion. The FAA does not agree with the 80 percent figure but recognizes that a significant number of accidents can be attributed to pilot error. Finding a pilot's action or inaction as a causal factor in an accident or incident is not intended to be the same as "fixing the blame."

One commenter contends that most of the airplanes to which this rule would apply operate in a very limited environment or portion of the airspace and that there is insufficient time to record much voice communication when a problem arises. The commenter further contends that the cause of most accidents in this area is probably pilot error during takeoff and landing and doubts that the addition of CVR's would shed any new light on the cause or circumstances surrounding any accident. The FAA does not agree that there is insufficient time to record meaningful voice communications. It is not the quantity but rather the quality of such data that may determine the cause in the relationship between the pilots, the airplane, and the operating environment at the time of an accident. Also, it is not just the voice communications that are useful in determining a cause but all recorded noise, i.e. switch actuation, engine revolution, warnings, etc.

One commenter asserts that the cockpit voice recorder would not add to the level of safety of a flight, and its only benefit, that of aiding accident investigation, is abstract and unproven. The FAA agrees that the CVR does not add to the level of safety of a specific flight but does not agree that the usefulness is abstract and unproven. There are years of experience with cockpit voice recorders in Part 121 aircraft that attest to the benefits to be derived from the recorders.

Another commenter contends the proposed rule is discriminatory since many small multiengine airplanes that not turbine powered are certificated to carry more than six passengers. The FAA does not agree that the rule is discriminatory.

One commenter asserts that an operator should be given the option of installing a flight recorder instead of the cockpit voice recorder because more information may be obtained from the former. As a regulatory proposal, this comment is outside the scope of the notice.

Three commenters contend that the CVR has proven to be an invaluable tool in accident/incident investigations and that it would be prudent to require a CVR for any multiengine, turbine-powered airplane operating under Part 135 with two pilots and carrying six or more passengers regardless of the date of manufacture of the airplane. The FAA evaluated this issue in the Trans Systems study while preparing this notice but concluded that the estimated costs would exceed the potential benefits if all multiengine airplanes are included.

Regulatory Evaluation

The FAA has completed a detailed regulatory evaluation of the final rule which is available in the regulatory docket. It is similar in form to the regulatory evaluation of NPRM No. 85-1, but many revisions have been made in response to comments that addressed the notice. The evaluation also incorporates more current cost and fleet forecast information.

The major findings of the evaluation of the final rule are summarized below. However, FAA's response to those comments that addressed the regulatory evaluation of the notice is presented in its entirety.

I. Discussion of Comments Addressing the Regulatory Evaluation of the NPRM

Numerous comments were received to NPRM No. 85-1 that addressed the regulatory evaluation of the proposed rule. These comments have been considered by the FAA and are discussed in this section. The regulatory evaluation of the final rule follows this discussion of comments. The FAA has revised its evaluation in many respects to reflect issues raised by the commenters.

A. Comments on Costs

A.1. Part 121 Proposals

Numerous comments criticize FAA's estimates of the cost to retrofit existing pre-1969 type-certificated airplanes operated under Part 121 with digital flight recorders and to upgrade these airplanes to record 11 parameters of information. In its regulatory evaluation of the notice, FAA considered the costs of various digital flight recorder and flight data acquisition unit equipment combinations that would meet the proposed requirements and estimated that the maximum cost for any of the various options, including labor and signal sources, would be approximately $22,000 per airplane. Comments have been received arguing that FAA's costs were significantly underestimated and that compliance costs could exceed $50,000 per airplane, more than twice FAA's highest estimate. Further, commenters also state that additional costs would result because airplanes would need to be removed from service to accomplish the retrofit; that the two-phase approach (initial digital recorder retrofit within 2 years followed by the upgrade to 11 parameters within 7 years) would result in higher compliance costs than a one-phase approach because airplanes would need to be taken out of service twice; that design certification costs had been omitted; and that many spherical foil recorders were still in service that would create special installation problems when replaced with digital recorders in standard one-half ATR boxes.

The FAA was unable to find evidence that the very high compliance cost estimates of approximately $50,000 would be incurred by cost conscious operators. These high costs could be realized if the equipment were purchased through third parties and if the installation work was not scheduled to coincide with regular maintenance intervals. However, because most prudent operators would negotiate with recorder equipment manufacturers to obtain the best fleet purchase price, reflecting quantity discounts, and because cost-conscious operators can be expected to use scheduled maintenance cycles as efficiently as possible, FAA expects that actual compliance costs will in most cases be similar to those estimated by the FAA. The FAA has raised its equipment cost estimates by 10 percent to reflect inflation in the prices of recorders since the notice was prepared 2 years ago.

To allow for the additional cost which may be incurred by some operators who find it necessary to rely on a modification shop to perform the retrofit as a complete package, including the provision of all necessary equipment, the FAA has added 40 percent to its estimated cost values for recorders, flight data acquisition units (FDAU's), and signal sources. This modification shop markup factor has been applied to 15 percent of the airplanes affected by the retrofit provisions of this final rule.

The FAA also found that air carriers, when performing contract maintenance work for other carriers, and modification shops charge labor rates of approximately $35 to $40 per hour. Further, the contractor's overhead expenses are already included in the labor rates charged to customers. The FAA has used a $40 labor rate in its evaluation of the final rule, slightly higher than the $35 value used for the notice.

Other factors may affect the compliance costs of the rule, not all of which may necessarily have been identified by the FAA or the commenters. Installation labor may in some instances exceed FAA estimates, or, as one commenter argued, recorder manufacturers may increase their prices following implementation of the rule (which the FAA does not expect to be much of a problem because of competition among manufacturers). However, to allow for these contingencies, the FAA has performed a sensitivity analysis on its cost estimates. This enables comparisons to be made of the potential effects variations in the cost estimates may have on the overall desirability of the new Part 121 recorder standards.

The FAA maintains its expectation that both the digital retrofit and parameter upgrade work can be completed without requiring airplanes to be removed from service specifically for this purpose. Although it will require careful planning on the part of operators, both the digital recorder retrofit and parameter upgrade work can be completed in steps and integrated into regularly scheduled maintenance intervals over the 2-year digital conversion compliance period and the 7-year parameter upgrade compliance period. Similarly, installation labor costs can be partially reduced by anticipating maintenance procedures involving aircraft disassembly that would also provide an opportunity to install the additional information parameter signal sources and wiring.

Engineering design and certification costs are expected to be relatively minor for each airplane type/recorder equipment combination that operators elect to install. These costs usually have already

been incurred by recorder equipment manufacturers and are reflected in the prices they charge their customers. Further, many of the airplane types affected by the amendments are operated by foreign carriers with similar or more stringent recorder requirements; therefore, the engineering work has, to a large extent, previously been completed. Finally, when prorated over the total number of airplanes converted using a particular equipment combination, the per-airplane cost attributable to design and certification is expected to be an extremely small portion of the overall equipment and installation costs. Nevertheless, a cost sensitivity analysis has been added to the regulatory evaluation, and this should adequately provide for the occasional situation where design and certification costs present a special problem.

The FAA agrees that for those aircraft equipped with the Lockheed spherical foil recorder, a new mounting rack will be required which will add about $500 to the installation costs. However, because of a previous rule change, any spherical recorders that had originally been installed in the wheel wells should have already been relocated to the rear of the airplane. Therefore, no additional installation costs should result from the need to relocate the recorder.

Commenters also question the FAA's estimate of the annual recorder maintenance savings that could be realized as a result of replacing foil recorders with digital recorders. One commenter states that converting to digital equipment would result in carriers experiencing a range of from $2,400 additional annual maintenance expense per airplane to $1,800 annual maintenance savings per airplane. This compares to the $2,500 annual maintenance savings estimate used by the FAA in the notice, which the FAA considered a conservative reduction of flight recorder manufacturer savings estimates that ranged from $3,000 to $5,000 annually per airplane.

The FAA maintains its expectation that because of the higher reliability of digital recorders in comparison to aging foil recorders, and the continuously increasing cost of the foil medium, digital recorders should result in net maintenance savings for operators. However, because of the concerns raised by commenters, the FAA has reduced its estimate of annual maintenance savings from $2,500 per airplane to only $1,500 per airplane in its analysis of the final rule. Further, the FAA also maintains its original expectation that the additional signal sources will require maintenance only infrequently and that any maintenance costs which may result from the signal sources will be negligible in comparison to savings resulting from the conversion to much more reliable digital equipment.

Similarly, the FAA expects that the relatively higher mean time between failures of digital equipment in comparison to foil recorders should actually reduce the potential for flight delays because of minimum equipment list requirements, rather than increase this possibility, as some commenters state.

Another commenter states that the short remaining life of older airplanes would reduce the maintenance savings attributable to digital recorders well below FAA estimates. However, in its regulatory evaluation of the notice, the FAA allowed for forecast fleet attrition in estimating the total maintenance savings that would result from the rule. Further, the FAA did not take credit for maintenance savings realized by digitally equipped airplanes that had voluntarily converted or were expected to voluntarily convert in the absence of the rule. Finally, in later years of the 15-year analysis period, the FAA reduced the percentage of active airplanes forecast in those years that would realize maintenance savings as a result of the new rule. This was because newly manufactured airplanes just entering service are currently delivered with digital recorders and because airplanes that operators have voluntarily converted generally would be the airplanes with the longest remaining service life.

One commenter expresses concern that airplanes exempt from the noise standards of Part 36 until January 1, 1988, would be retired shortly after the effective date of the flight recorder final rule. As stated in the notice, the FAA expects that the availability of hush kits will enable many of these airplanes to remain active after their noise exemption expires. Similarly, Boeing 707 and McDonnell Douglas DC-8 airplanes, other than DC-8-70's retrofitted with noise compliant engines, were excluded from the fleet expected to be affected by the proposed rule because of other Part 36 noise standards that became effective in 1985. However, since the notice was written, hush kits have become available for both DC-8's and Boeing 707's, and a limited number of these airplanes are now expected to remain in service. Therefore, based upon preliminary information prepared by

the FAA's Office of Environment and Energy, these types of airplanes have been added to the forecast of the pre-1969 type certificated airplane fleet expected to be affected by the rule.

Other comments state that any additional weight attributable to the digital retrofit and parameter upgrade would result in slightly higher fuel consumption. The FAA agrees and has added a weight penalty cost factor to its analysis.

Comments were received stating that in its cost estimates the FAA did not allow for the lost residual value of foil recorders when the new rule makes them instantaneously obsolete. The FAA recognizes that this is a valid consideration, however, this factor has already been reflected in the analysis. It is the remaining utility or useful life of the foil recorders that will be lost as a result of this rule change, or in other words, the foregone *benefits* that would have been derived from their continued use. (The equipment costs of the old foil recorders are sunken costs that will not affect, or be affected by, any decisions made concerning the new requirements. Therefore, these costs are not relevant for the present analysis and have been excluded.) However, the regulatory evaluations of both the notice and the final rule have assessed the *improvements* in accident investigations and consequently safety which will result from the new requirements, i.e., the *additional* or *incremental* benefits which will be realized over and above the current rule. Therefore, to offset the incremental benefits by the lost benefit of the old recorders (i.e., the lost residual value) would represent double-counting. Further, because the incremental cost of the new requirements is on average only about one or two cents per enplanement over the analysis period (based on *FAA Aviation Forecasts Fiscal Years 1986–1997*), operators should not find it difficult to recover their additional costs in the fares collected from passengers who are the ultimate beneficiaries of the safety improvements.

The NTSB expresses concern in its comments that the longitudinal acceleration parameter had not been included among the additional information parameters proposed in the NPRM. The FAA has reconsidered this question and decided that longitudinal acceleration should be included. Although this change from the original proposal may at first glance appear potentially expensive because it will affect airplanes type certificated after September 30, 1969, as well as those type certificated before that date, it will have a relatively minor cost impact. First, the FAA has determined that virtually all post-1969 type certificated airplanes are equipped with tri-axis accelerometers, capable of sensing longitudinal, vertical, and lateral acceleration; and in most cases the longitudinal axis sensor is wired to the recorder. Second, for airplanes type certificated before 1969, the FAA will allow operators to substitute longitudinal acceleration for the pitch trim parameter originally proposed for existing airplanes that will be required to upgrade to 11 parameters and to substitute longitudinal for lateral acceleration on newly manufactured airplanes subject to the new 17-parameter requirement. A slight additional signal source expense will be incurred over that estimated in the notice for airplanes upgrading from 6 to 11 parameters, and the regulatory evaluation of the final rule has been revised accordingly.

One commenter states that the 1983 Trans Systems Corporation report entitled "Cockpit Voice and Flight Data Recorder Evaluation" indicated that expanding the retrofit requirement for pre-1969 airplanes from the 6-parameter digital conversion to the 11-parameter upgrade requirement would more than double the total compliance costs of the rule change. The Trans Systems Corporation study did state this. However, the Trans Systems Corporation study presented an overview of numerous cockpit voice recorder and flight recorder options for airplanes operating under various operating regulations of the FAR. The FAA's regulatory evaluations of NPRM No. 85-1 and of the final rule are much more focused and have analyzed the specific option that has been proposed and adopted in much greater detail than was possible in the Trans Systems Corporation study. The FAA's cost estimates of the final rule indicate that the 11-parameter upgrade requirement will increase total compliance costs by only about one-third over the total costs of a rule that would require just the 6-parameter digital retrofit for existing pre-1969 airplanes.

One commenter expresses concern that the new flight recorder requirements would create problems for the international exchange of aircraft for either sale or lease. The FAA does not agree. Many foreign countries currently have flight recorder requirements that exceed those of the United States. The new requirements being adopted by this final rule will reduce the differences between the airplanes of U.S. operators and those of many foreign operators. This may in fact facilitate, rather than hamper, the international exchange of aircraft.

Other comments state that the development of new recorder technology and the expense of maintaining old foil recorders would result in the gradual attrition of foil recorders. Therefore, they concluded, this rulemaking action was unnecessary. The FAA disagrees. Voluntary replacement of foil recorders with digital equipment has already occurred in about one-third of the pre-1969 fleet affected by this rulemaking, and in its analysis of the notice the FAA estimated that, in the absence of a new rule, this trend would have continued until about one-half of the pre-1969 fleet had been voluntarily converted at the time the new rule would mandate the conversion. Although attrition could have been expected to continue beyond this deadline in the absence of the rule change (and this has been considered in estimating the compliance costs of the final rule), it alone would not have resulted in a timely replacement of the remaining foil recorders still active in the fleet. Further, attrition would not have resulted in the voluntary upgrade of the safety information parameters that will be required by this final rule.

One commenter states that because his operation intends to purchase new airplanes in the near future, there would not be enough time to fully depreciate the investment in the new flight recorders that would be required by this rule. Although this is true, the resale value of the operator's current fleet should be enhanced because the airplanes have already been equipped with the digital recorders that many potential customers will also require for their operations. The value of these assets should not be lost when the airplanes are placed on the market.

A.2. Part 135 Proposals

Some commenters disagree with the FAA's estimates of the cost to equip newly manfactured airplanes operated under Part 135 with cockpit voice recorders. In NPRM No. 85-1, FAA estimated that the cost would be $7,275 per airplane based upon the least expensive unit available at the time. This estimate was the CVR cost to the airframe manufacturer but did not include any markup by the airframe manufacturer, only installation labor. One commenter obtained a quote from an airframe manufacturer of about $30,000 per airplane. This higher cost could be incurred only if a more expensive model CVR were to be installed in the airplane and if the airframe manufacturer significantly marked up the recorder price over its own acquisition cost. However, the FAA's cost estimates in the final rule are based on the expectation that CVR equipment will be furnished by the airplane customer to the airframe manufacturer for installation. This is the common practice in the industry for avionics equipment because it enables prudent operators to negotiate with equipment manufacturers to obtain the best fleet purchase price and quantity discount.

Another commenter states that the FAA did not consider the reduced complexity and associated costs of recorders meeting the Society of Automotive Engineers Aerospace Standard (AS) 8039, "Minimum Performance Standard—General Aviation Flight Recorder," issued in January 1985. Although this standard was not available in 1983, the original Trans System Corporation study used order of magnitude recorder cost estimates reflective of simpler recorder designs in its evaluation of various Part 135 recorder options. Further, the FAA has contacted various recorder manufacturers and determined that none currently plan to produce a separate CVR unit meeting the AS 8039 standard, although some are considering a combined cockpit voice/flight data recorder unit. Therefore, the FAA has again based its CVR equipment cost estimates for the Part 135 amendment on a relatively inexpensive CVR model that is currently available. The FAA has adjusted its cost estimates in the evaluation of the final rule to reflect 1986 equipment prices.

Another comment states that the additional weight of the cockpit voice recorder would result in a slight increase in fuel consumption for those airplanes that will be required to install them. The FAA agrees and has added a weight penalty cost factor to its analysis.

One commenter expresses concern that the additional weight of the CVR would sometimes result in payload restrictions. FAA does not expect that this will be a problem for the types of airplanes affected by the rule. The turbine-powered airplanes typically used by Part 135 operators have sufficient performance capability to accommodate the slight additional weight of the CVR without affecting most operations. In high-altitude, hot-temperature conditions where the airplane will be operating closer to its performance limits, the weight of the CVR is light enough that careful planning of fuel load should prevent impacting payload any further than it might already have been impacted by those conditions. Situations where the CVR weight would be critical to conducting an operation with the desired payload are expected to be extremely rare.

A related comment also argues that the added weight of the recorder would result in higher engine operating temperatures and consequently higher engine maintenance costs. The FAA does not agree. The additional weight of the CVR installation will only be about 30 pounds, and this represents only a very small fraction of a percent of the overall weight for those airplane types that will be effected by the rule. Any possible effect on engine operating temperatures, and consequently engine maintenance costs, will be so slight as to be unmeasurable.

B. Comments on Benefits Analysis

B.1 Part 121 Proposals

Some of the comments addressing the analysis of benefits focus on the particular examples of accident investigations that were cited in the evaluation and on the discussion of advances in understanding wind shear that the FAA attributed to expanded parameter recorders.

One commenter states that the FAA provided no evidence to support its contention that the expanded parameter flight recorder requirements "are necessary to ensure that all of the underlying causal factors of an accident are identified" and that the FAA only referenced two accidents in the notice in discussing the benefits of recorders. The benefits analysis in the complete regulatory evaluation, available in the docket, discussed six accidents or incidents supporting the value of expanded parameter recorders, although only three were referred to in the summary of the regulatory evaluation published in NPRM No. 85-1. The availability in the docket of the complete regulatory evaluation was stated in the notice.

Another commenter states that no benefits would be realized by replacing foil recorders with digital recorders during the first phase of implementation. Airplanes retrofitted with digital recorders would be allowed to operate for at least 5 years before being required to upgrade to 11 parameters. The FAA does not agree with this argument. The FAA reviewed NTSB data from 1983 to early 1986 and found that in about 49 percent of the accident or incident investigations in which foil recorder tracings were read, a recorder malfunction or maintenance deficiency resulted in the partial or complete loss of recorded information. Further, the two-phase approach is intended to allow operators to perform all retrofit work during regularly scheduled maintenance cycles.

One commenter questions specific details of one of the examples. In the notice, the FAA stated that following the May 1979 crash of a DC-10 at Chicago, the expanded 17-parameter digital flight recorder provided evidence that the loss of control was a direct result of the unwanted retraction of the airplane's left leading edge slats, not the separation of the No. 1 engine and pylon assembly itself. The commenter asserts that this statement is erroneous because the recorder did not record slat retraction since power to the recorder was when the engine and pylon separated. Identification of the unwanted slat retraction was not based on recorded information of the left inboard and outboard slat positions. These parameters were lost when the No. 1 engine and pylon separated, together with certain other parameters that received electrical power from the No. 1 a.c. generator bus. However, the flight recorder continued to record all remaining parameters for approximately one-half of a minute until the recording ended upon impact. It was the *correlation* of the remaining recorded aircraft and flightcrew information, together with simulator tests, knowledge of the DC-10's performance characteristics, and other investigation findings, that resulted in the conclusion that the left leading edge slats had retracted.

Other comments question the validity of the FAA's claim that recorders contributed significantly to a better understanding of wind shear. The comments state that almost all wind shear accidents involved airplanes equipped with 6-parameter foil recorders and that sufficient information was available to determine probable cause. The FAA does not disagree that the presence of wind shear could be determined from the limited parameter recorders and other sources of accident information. However, only a limited amount of information concerning airplane performance or flightcrew response in these situations could be obtained. Although very few wind shear accidents or incidents involving expanded parameter recorders have occurred, they have provided significant amounts of information about wind shear. Further, preliminary analysis of information recorded by the expanded parameter recorder installed aboard the Lockheed L-1011 that crashed in Dallas in August 1985 has provided strong evidence confirming theories about especially hazardous microburst characteristics that previously had only been simulated in laboratory tests.

Comments also state that, because the wind shear problem was well on the way to being solved, the FAA was relying on the detection of other "random unknown safety hazards." The commenter states that the FAA's estimate of a range of between zero and four accidents, distributed around a mean of 2, that might be prevented during the 15-year analysis period as a result of information learned from the expanded parameter recorders was speculation. FAA expects that the information learned from the expanded parameter recorder, especially in the area of human factors, could result in the prevention of a number of accidents in the future. However, because the relationship between accident investigations, increased understanding of potential hazards, improvements in equipment and crew training, and the actual prevention of future accidents is somewhat indirect and cannot be easily measured, the FAA will not attempt to assign a specific probability distribution to the potential number of future accidents that might be prevented. as it did in the evaluation of the notice. Rather, the FAA will show that if just one accident is prevented as a result of this rule, the compliance costs, in terms of costs per fatality avoided, fall well within the range of values generally considered acceptable by various regulatory agencies when implementing safety regulations. It is very reasonable to expect that at least one accident will be prevented as a result of information learned from the expanded parameter recorders required by this final rule.

One commenter states that the Trans Systems Corporation study concluded that because of the well-known and proven characteristics of the pre-1969 airplanes, "the probability of not being able to determine a cause of an accident for these aircraft is considered to be low." The FAA agrees that the basic cause of an accident usually can be detected from limited parameter recorders and other sources of accident information. However, as stated previously, only a limited amount of information concerning airplane performance and flightcrew response during these accident situations can be obtained, and the opportunity to improve flightcrew reactions in potentially survivable situations is lost.

One major point needs to be made concerning those comments that address the analysis of benefits. Comments tend to focus on details of specific examples but miss the more general principles that these examples were attempting to demonstrate. The detailed information that expanded parameter flight recorders make available allows a much more objective accident analysis to be completed. Investigators can compare and correlate the actual performance of the airplane with that intended by the flightcrew, and, most importantly, the numerous assumptions that investigators often must make in determining probable cause can be reduced significantly. Thus, more specific and focused corrective actions can take place, especially in the area of human factors and crew training, than would otherwise be possible in the absence of this additional information. Further, the graphic depiction of an accident scenario that can be reconstructed in great detail will leave a much more lasting impression on the part of flightcrews. This concept is very similar to the old maxim "A picture is worth a thousand words." The opportunity that a detailed, specific accident report provides for flightcrews to more thoroughly think through their own possible reactions if they were to find themselves in a similar situation is a learning experience that cannot be obtained from an accident report characterized by more general conclusions based upon numerous assumptions.

B.2 Part 135 Proposals

Comments that address the benefits of the proposal to require that CVR's be installed on newly manufactured turbine-powered airplanes operated under Part 135 generally question the value of such recorders. Commenters state that the safety benefits that the FAA attributed to the CVR's were overstated.

The FAA considers this rule to be a long-term corrective acton reflecting recent changes in the structure of the airline industry. Part 135 operations have grown significantly since airline deregulation in 1978 opened up the commuter industry, yet only turbojet airplanes equipped with 10 or more passenger seats are currently required to have CVR's (Section 135.151). Implementation of this final rule will eventually result in all turbine-powered airplanes operated by the commuter industry being equipped with a recorder of some type—a CVR for those smaller airplanes with 30 seats or less operated under Part 135, and both a CVR and flight recorder for those larger airplanes with between 31 and 60 seats operated under Part 121. The FAA recognizes that these benefits will not be realized immediately, but expects that this long-term approach will provide

the public with the safety benefit of more thorough investigations of accidents involving those airplane types that now carry a much larger share of passenger traffic than in previous years, yet not unduly burden the operators of these airplanes.

II. Evaluation of Costs and Benefits

The 15-year period of the regulatory evaluation includes the years from 1987 through 2001. Values are expressed in 1986 dollars, and present values have been calculated using the 10 percent discount rate prescribed by the Office of Management and Budget.

A. Costs

1. Amendment of the flight recorder requirements for aircraft operating under Part 121.

The major cost components of complying with the amendments to the Part 121 flight recorder requirements include the digital flight recorder, an FDAU necessary to convert input signals into a digital format, signal sources (such as transducers, potentiometers, etc.) when none are presently available for the additional parameters to be recorded, labor costs for installation, and ground support equipment to maintain the digital recorders. Offsetting these retrofit and upgrade costs are the present value of the retrofit costs that would have eventually been incurred to replace many foil recorders reaching the end of their economic lives subsequent to the digital conversion deadline established by this final rule, and the reduction in the cost of maintenance for a digital flight recorder in comparison to the older, electromechanical foil recorders.

In response to comments, a cost factor has been added reflecting the fuel penalty resulting from any increases in airplane weight that are attributable to the new rule. Cost estimates have also been modified to reflect substitution of the longitudinal acceleration parameter for other parameters originally proposed in the notice and special retrofit installation requirements for airplanes equipped with older, spherical foil recorders.

Further, the FAA expects that the majority of operators will find it most economical to purchase recorder and FDAU equipment directly from the manufacturers of that equipment, even though the actual installation work may be contracted out. However, in some instances an operator may have a modification shop provide the equipment as well as the labor. This would increase the retrofit costs to the operator because the modification shop marks up the parts it supplies. This additional unit cost in converting some airplanes has been considered in estimating the costs of the final rule.

Other cost factors may potentially affect the compliance costs of this rule. These factors include the possibility that recorder manufacturers might attempt to increase the prices of their equipment following implementation of the rule (which is not expected to be a very significant problem because of competition between manufacturers), that in some special cases design engineering and certification costs may not be fully included in equipment costs, or that installation labor may exceed FAA's estimates, even when the work is carefully planned ahead of time. To allow for these contingencies, the FAA has performed a sensitivity analysis on its cost estimates.

For airplanes operated under Part 121, the present value total cost of the various digital flight recorder requirements in this final rule, after deducting maintenance savings and the present value of costs which would result from the expected future attrition of many foil recorders in the absence of this rule, has been estimated to be approximately $27.6 million. These costs are summarized in Table 1 below:

Table 1

Summary of Part 121 Flight Recorder Costs
Present Value—1986 Dollars
(Thousands)

Initial Retrofit with Digital Recorder	$24,870
Upgrade from 6 to 11 Parameters	8,612
Newly Manufactured Aircraft	1,385
Ground Support Equipment	2,504
Fuel Penalty	1,824
Subtotal	$39,195
Less Anticipated Foil Attrition/Digital Replacement	(3,689)
Less Maintenance Savings	(7,928)
Total Cost	$27,578

Should the contingencies allowed for in the cost sensitivity analysis result in actual costs that are 25 percent higher than estimated, and actual deductions that are 25 percent lower, the total cost could increase to approximately $40.3 million. These costs represent discounted values of incremental costs incurred as a result of the final rule for the 15-year period between 1987 and 2001.

The revised unit costs and additional cost factors used in evaluating the final rule are summarized in Table 2.

Table 2

Summary of Revised Assumptions Used in Estimating Costs of Amendments to Part 121 Flight Recorder Requirements

1. Initial retrofit from foil to digital flight recorder:

Direct replacement, single unit digital flight recorder

Equipment	*Installation*
$15,420 combined FDAU/flight recorder unit	$0

Separate flight recorder and FDAU

Equipment	*Installation* (including 6-to-11 parameter upgrade)
$11,000	$1,400 labor (35 hours @ $40 per hour, FDAU in avionics bay)
$11,000 mini-FDAU	$1,900 signal sources
$22,000	$3,300 Total

2. Upgrade from 6-parameter digital to 11-parameter digital flight recorder:

Direct replacement flight recorder capable of recording 11-parameters as single-unit

Equipment	*Installation*
$2,200 Modification kit (when required)	$2,000 labor (50 hrs. @ $40 per hour, FDAU/recorder in rear of aircraft)
	$1,900 signal sources
	$3,900 Total

Direct replacement flight recorder requiring external mini-FDAU to record 11-parameters

Equipment	*Installation*
$11,000 mini-FDAU	$3,300 (same as separate FDAU and flight recorder installation above)

3. Installation of 17-parameter vs. 6-parameter digital flight recorder during assembly of newly manufactured aircraft:

$4,800 average FDAU/flight recorder cost differential over 6-parameter options
1,400 labor (35 hrs. @ $40 per hour)
2,175 signal sources
$8,375 Total

4. Miscellaneous Costs

a. Recorder, FDAU, and signal source equipment costs increased 40 percent when purchased through modification shop rather than directly from manufacturer.

b. Retrofit of spherical foil recorders—$500 additional cost to install rack for standard ½ ATR long container.

c. Lost asset value of obsolete foil recorders—$4,500 per unit.

d. Fuel penalty 15 gallons annually for each additional pound of weight added to transport category airplane. Current fuel price $0.85 per gallon. Average additional weight estimated at 10 pounds for airplanes subject to retrofit and 25 pounds for newly manufactured airplanes requiring 17 parameters.

e. Digital recorder ground support equipment (maintenance and testing)—$55,000 per set.

5. Maintenance Savings—Foil to Digital Conversion:

$1,5000 annually per airplane

Source: Equipment price quotations from flight recorder and FDAU manufacturers, labor and signal source estimates from FAA aircraft engineering and maintenance staff, air carrier maintenance personnel, and modification shop personnel.

2. Amendment requiring cockpit voice recorders on certain newly-manufactured, turbine-powered aircraft operated under Part 135.

The equipment that will be required to comply with this proposal includes the cockpit voice recorder, the control unit with area microphone, and the vibration mounts, connectors, and other hardware required for installation. The manufacturer of a relatively inexpensive unit currently available indicates that this equipment could be purchased for approximately $9,500 per set. Adding 15 hours of labor at $40 per hour for installation, the total cost of equipping a newly manufactured airplane with a CVR has been estimated to be $10,100.

The maintenance cost of a CVR is approximately $150 per 1,000 hours of operation. The FAA estimates that the Part 135 aircraft affected by this proposal are utilized a maximum of 1,600 hours per year. Annual maintenance costs are therefore estimated to be $240.

The additional airplane weight resulting from the CVR is approximately 30 pounds. Based upon the 14 gallons of fuel estimated to be consumed annually for each pound of weight carried aboard typical commuter airplanes affected by this rule, and current jet fuel prices in the $.80 to $.85 per gallon range, the FAA estimates that the cost of additional fuel attributable to the weight of the CVR will be approximately $350 per year for each airplane.

Estimating the number of multiengine, turbine-powered airplanes certificated to carry six or more passengers and requiring two pilots, which will be manufactured during the 15-year period of this analysis and operated under Part 135, is extremely difficult because the commuter market is undergoing a major transition. A new generation of aircraft developed specifically for the expanding commuter industry has recently begun to enter service. These new aircraft, most of which are large enough to operate under Part 121, are expected to dominate the commuter market in the years to come, but the exact impact that they will have on the future market share of the older generation commuter aircraft which operate under Part 135 is difficult to predict.

Because of the uncertainty characterizing this transitional period, the FAA estimated a range of costs based upon a low delivery rate of 120 aircraft per year and a high delivery rate of 240 aircraft per year in the regulatory evaluation of the notice. However, the FAA has reviewed current trends in the delivery of new turbine-powered airplanes with airframe manufacturers or their representatives and found that its original estimates for Part 135 were somewhat high. Therefore, the FAA has revised its forecast downward for the evaluation of the final rule and estimates that only between 75 and 125 new turbine-powered airplanes for Part 135 operators will be delivered annually during the period of this analysis.

Applying the unit cost values discussed above to these delivery rates and discounting yields present value total costs which range from $8.3 to $13.8 million.

B. Benefits

1. Overview of Benefits Analysis

Estimating the benefits of flight recorders and cockpit voice recorders is difficult because a recorder is an investigative tool, and unlike other airborne safety devices, the absence of a flight recorder

or cockpit voice recorder cannot be considered the cause of or a contributing factor to an accident involving that airplane.

Therefore, the benefits of flight recorders and cockpit voice recorders can only be measured in abstract terms; that is, how the recorder's contribution to determining the cause of one accident can lead to corrective measures to prevent other similar accidents, or, in other words, preventing the opportunity cost of lost information. It is not possible to accurately predict the number of accidents that would have occurred had these corrective actions not been taken. Nor is it possible to look at accidents wherein the probable cause remained elusive and state with assurance that the cause would have been positively determined and corrective action taken if the accident airplane had recorded more information. To demonstrate the utility of flight data and cockpit voice recorders, the benefits analysis of the regulatory evaluation examines the types of accidents in which recorders have been or could have been the key element in determining the cause of an accident.

2. Proposal to amend the flight recorder requirements for aircraft operating under Part 121.

The accident investigations cited in the regulatory evaluation demonstrate how expanded parameter flight recorders have been effective in the determination of an aircraft structural, mechanical, or systems failure. This information has led directly to corrective actions such as aircraft modifications or changes in operating procedures that can prevent future accidents. Further, the determination that an accident was *not* caused by an airplane mechanical, structural, or systems problem can also be quite beneficial because costly but unnecessary design analyses or modifications to an airplane prompted by hypotheses rather than conclusive evidence can be prevented. Similarly, use of expanded parameter flight recorders could prevent an unnecessary suspension of an airworthiness certificate and avert economic losses to passengers and carriers alike. Although such costs are difficult to quantify, the benefits of avoiding these costs must be recognized.

Another benefit resulting from the determination of accident cause through expanded parameter flight recorders is the ability to define more precisely those operational problems that need to be addressed by research and development programs. The most prominent example of this is wind shear. Expanded parameter flight recorders have made, and continue to make, significant contributions towards understanding this hazardous phenomenon and improving pilot training programs so that flightcrews are better able to handle wind shear encounters. At least one averted accident has been attributed directly to the improved techniques that have resulted from the wind shear program.

In the regulatory evaluation of the notice, the FAA developed a probability distribution of possible future accidents that could be prevented as a result of the expanded parameter recorder requirements. However, the relationship between accident investigations and the actual prevention of future accidents is somewhat abstract and cannot be directly observed. Further, the prevention of accidents is the cumulative result of numerous related learning experiences, only one of which is the feedback made possible through recorded accident information. In most cases it is not possible to link a prevented accident with a specific source of learning, if in fact it is even possible to identify most situations where an accident has been averted. The accident that does not occur often goes unnoticed. For these reasons, the FAA has reconsidered its original approach, and has determined that a meaningful probability distribution of the future accidents that may be prevented as a result of this final rule cannot realistically be assigned. Any effort to do so would be an attempt to give the analysis a greater degree of precision than the nature of the problem and the availability of information can support. However, because the various arguments presented in the regulatory evaluation demonstrate how expanded parameter recorders enable the detailed correlation of accident investigation information and contribute to much more specific corrective actions, it is highly probable that at least one accident, if not more, will be prevented as a result of information learned because of the amended flight recorder requirements which are being adopted in this final rule. The benefits of flight recorders are realized particularly in the area of human factors analysis providing information on how flightcrews respond to hazardous situations, and this information is valuable for preventing future accidents regardless of whether it is learned from an accident involving an older or newer airplane model.

The FAA estimates that the benefits that will be realized from a typical catastrophic accident that is avoided in the future will be the prevention of approximately 110 passenger and crew fatalities, the loss of the airplane, and the associated accident investigation costs. The standard average air carrier hull value of $8.9 million for a destroyed airplane and the standard NTSB major accident investigation cost of $953,000 have been used to estimate the quantifiable benefits for each accident prevented.[1]

Discounting these values as a uniform series of payments over the 15-year period of the analysis (to allow for the random nature of accidents that may be prevented anywhere within that period) at the 10 percent discount rate prescribed by OMB yields an average quantifiable benefit of $5.2 million for each accident prevented. From this information and the previous cost analysis, the cost per fatality avoided has been determined. This is discussed subsequently in subsection C, "Comparison of Costs and Benefits."

3. Amendment requiring cockpit voice recorders on certain newly-manufactured, turbine-powered airplanes operated under Part 135.

The benefits that will result from the Part 135 amendment requiring cockpit voice recorders on all newly manufactured multiengine, turbine.powered airplanes certificated to carry six or more passengers and requiring two pilots are very similar to those achieved from flight recorders on Part 121 aircraft. Implementation of this rule will eventually result in all turbine-powered airplanes operated by the commuter industry being equipped with a recorder of some type—a CVR for those smaller airplanes with 30 seats or less operated under Part 135, and both a CVR and flight recorder for those larger airplanes with between 31 and 60 seats operated under Part 121. Therefore, the traveling public would benefit from the learning opportunities that more thorough investigations would allow.

The CVR's are particularly useful for human factors analysis. Although frequently the aircraft system malfunction, weather situation, or other causal factor can be identified, without the recorder it is difficult to ascertain whether or not the flightcrew responded to the emergency situation appropriately. The lack of this information makes it difficult to develop techniques that could benefit future travelers caught in similar situations. CVR's also can pick up other information useful to investigators, such as engine sounds, audio alarms and signals, and the sounds of some switches and control activation.

There have been a number of recent accidents involving turbine.powered airplanes operated under Part 135 in which a CVR would have greatly assisted in the accident investigations. This is especially true of the December 1984 Embraer Bandeirante accident in Jacksonville, Florida. The airplane crashed shortly after takeoff, but the exact cause of this accident has been extremely difficult for investigators to pinpoint. The other fatal accidents include three landing accidents and one training accident. Investigations of all of these accidents would have been enhanced if recorded information were available. Adoption of this final rule will prevent future occurrences of this problem in many newly manufactured airplanes operated under Part 135 and will contribute to the prevention of future accidents.

The FAA estimates that the benefits that will be realized from a typical catastrophic commuter accident that is avoided in the future will be the prevention of approximately 12 passenger and crew fatalities, the loss of the airplane, and the associated accident investigation costs. An average hull value of $1.0 million for a typical used turbine-powered airplane and the previously cited major accident investigation cost of $953,000 have been used to estimate the quantifiable benefits for each accident prevented.

Discounting these values as a uniform series of payments over the 15-year period of the analysis (to allow for the random nature of accidents that may be prevented anywhere within that period) at the 10 percent discount rate prescribed by OMB yields an average quantifiable benefit of $1.0 million for each accident prevented. From this information and the previous cost analysis, the cost per fatality avoided has been determined. This is discussed subsequently in subsection D, "Comparison of Costs and Benefits."

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[1] See *Economic Values for Evaluation of Federal Aviation Administration Investment and Regulatory Programs* (Report #FAA-APO-81-3), and *Economic Analysis of Investment and Regulatory Decisions—A Guide* (Report #FAA-APO-82-1), FAA Office of Aviation Policy and Plans. Values have been adjusted for inflation as prescribed in these guides.

C. Comparison of Costs and Benefits

1. Amendment of the flight recorder requirements for airplanes operating under Part 121.

The FAA has estimated that the total compliance costs of meeting the new Part 121 flight recorder standards will be approximately $27.6 million. The cost sensitivity analysis indicated that this figure could increase to approximately $40.3 million. If one or more catastrophic accidents are prevented, which is a highly probable consequence of this rule change, then the loss of at least one transport category airplane and 110 fatalities will be avoided.

This will prevent aircraft hull value and accident investigation costs of $5.2 million (discounted present value). Deducting the prevented hull loss and accident investigation costs from the total compliance costs yields that portion of costs that will go entirely toward saving lives. Based upon the average of 110 fatalities avoided for each accident prevented, the maximum cost per fatality avoided will fall between $203,000 and $319,000, depending on whether the higher costs allowed for in the cost sensitivity analysis are in fact incurred. These are maximum values for the cost per fatality avoided and will be less if more than one accident is prevented as a result of this rule.[2]

2. Amendment requiring cockpit voice recorders on certain newly-manufactured, turbine-powered airplanes operated under Part 135.

The FAA has estimated that the total compliance costs of meeting the new Part 135 CVR requirement will range from $8.3 to $13.8 million, depending on the number of new airplanes delivered during the 15-year period of this analysis. If one or more catastrophic accidents are prevented as a result of information learned from these CVR's, then the loss of at least one commuter airplane and 12 fatalities will be avoided. This will prevent aircraft hull value and accident investigation costs of $1.0 million (discounted present value). Deducting the prevented hull loss and accident investigation costs from the total compliance costs yields that portion of costs that will go entirely towards saving lives. Based upon the average of 12 fatalities avoided for each accident prevented, the maximum cost per fatality avoided will be between $602,000 and $1.1 million. However, there is a greater likelihood of realizing the potential benefits as the cost per fatality avoided increases because there will also be more airplanes equipped with CVR's in active service. Further, the cost per fatality avoided will be less if more than one accident is prevented as a result of this rule.

III. International Trade Impact Analysis

The amendments will have little or no impact on trade for either U.S. firms doing business in foreign countries or foreign firms doing business in the United States. The amendments will affect only U.S. air carriers because foreign air carriers are not subject to Part 121 or 135. Foreign air carriers are prohibited from operating between points within the United States; therefore, they will not gain any competitive advantage over the domestic operations of U.S. carriers. In international operations, foreign air carriers are not expected to realize any cost advantages over U.S. air carriers because many foreign countries have even more stringent recorder requirements than those adopted in this final rule. Therefore, there will essentially be no trade impact.

IV. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires agencies to review rules that may have "a significant economic impact on a substantial number of small entities."

All of the rule changes will directly affect those air carriers operating under Parts 121 and 135 that are classified as small entities. However, with one exception, they are not expected to result in "a significant economic impact on a substantial number" of small entity air carriers.

[2] The prevented accidents that may result from this rule could occur at any time during the period of this analaysis. Generally, there is a social preference to realize benefits at an earlier rather than later time, and when a specific monetary value has been assigned to a particular benefit, discounting is used to reflect this time preference. Benefits realized earlier will have a higher present value than those realized later. However, when it is difficult to assign a specific monetary value to a benefit and it is therefore expressed in other units for comparison to costs (in this case the benefit unit is the number of fatalities avoided), discounting of the benefit units would only serve to introduce an element of specious accuracy into the analysis and is therefore inappropriate. Realistically, the actual benefit units can only be compared to the present value of costs, with the understanding that if it could be measured more precisely, the time preference would be to realize the benefits as early as possible.

The following evaluation analysis explains the reasons for this determination. In developing estimates of annualized net compliance costs, uniform annualized costs for capital investments have been determined by multiplying the amount of the investment by a capital recovery factor appropriate for the discount rate and period of the analysis. A capital recovery factor of .125, based upon a 10 percent discount rate over a 15-year period, has been used in this analysis. Threshold cost values and small entity size standards are those stated in FAA Order 2100.14, *Regulatory Flexibility Criteria and Guidance*. Values have been adjusted to 1986 dollars.

The Part 121 amendment requires aircraft to initially equip with 6-parameter digital flight recorders and later increase the number of parameters to 11. The unit investment cost for the most expensive configuration (separate FDAU and separate flight recorder) has been estimated to be $28,000, including a prorated share of the test equipment cost, and assuming that the foil recorder on this airplane would not have been replaced at any time during the analysis period in the absence of this rule. The uniform annualized cost for this investment is $3,508. Adding the annual fuel penalty cost of $128 and deducting the annual maintenance savings of $1,500 from this amount yields an annual net cost of $2,136 per aircraft.

The threshold values defining a significant economic impact for scheduled carriers are $94,094 if the entire fleet has a seating capacity of over 60 seats and $52,546 for other scheduled carriers. A carrier would have to convert 45 or 25 airplanes, respectively, to exceed either of these thresholds. A small entity is defined as one which owns nine or fewer airplanes. Consequently, any scheduled operator exceeding either of the minimum cost thresholds for scheduled operators as a result of this amendment would not be considered a small entity.

However, the threshold value defining a significant economic impact for an unscheduled operator is only $3,666. A carrier would only have to convert two airplanes to exceed this threshold. Data collected by the FAA on Part 121 fleet size distribution indicated that there are 64 unscheduled carriers operating under Part 121 and that 26 of these carriers, or 40 percent, operate 2 or more airplanes. This is more than one-third of the small unscheduled operators subject to the rule. Consequently, the FAA has determined that this amendment may have a significant economic impact on a substantial number of small unscheduled operators, and a regulatory flexibility analysis is required under the terms of the RFA. The regulatory flexibility analysis for these unscheduled operators follows in Section V.

Those air carriers that have already retrofitted their fleet voluntarily would only incur costs as a result of the requirement to upgrade from 6 to 11 parameters. However, none of the carriers that the NTSB identified as having converted voluntarily are small carriers. Therefore, no small entities would be impacted by this requirement.

The Part 135 amendment requiring CVR's on certain turbine-powered aircraft would not have a significant economic impact on small entity commuter air carriers. The uniform annualized cost of the $10,100 investment to install a CVR on a newly-manufactured aircraft is $1,266. Adding the annual maintenance and fuel penalty costs of $590 yields a net annual compliance cost of $1,856. Commuter carriers are scheduled operators and therefore the threshold value of $52,546 applies. An operator would have to buy 29 new aircraft to exceed this threshold, far greater than the 9 aircraft defining a small entity. Therefore, no small entity commuter carriers will be affected by this amendment.

With respect to on-demand air taxis operating under Part 135, the FAA's Aviation Standards National Field Office in Oklahoma City lists approximately 4,000 operators registered as on-demand air taxis. The majority of these are small entities. However, data examined in the *FAA Statistical Handbook of Aviation* indicate that less than 20 percent of all air taxis operate turbine-powered aircraft. Therefore, the criteria for a "substantial number," one-third of the small entities affected, has not been exceeded.

For these reasons, the amendments adopted in this final rule are not expected to have a significant economic impact on a substantial number of small entities for all affected categories other than the small unscheduled Part 121 operators. However, a regulatory flexibility analysis is required under the terms of the RFA for the small unscheduled Part 121 operators.

V. Final Regulatory Flexibility Analysis

As required by Section 604 of the RFA, the following analysis deals with the amended Part 121 flight recorder requirements as they relate to small unscheduled operators.

A. Why Agency Action is Taken

The reasons for agency action are detailed in the final rule and the regulatory evaluation. Briefly, the amendment upgrades flight recorder standards for airplanes receiving original type certificates before September 30, 1969, and operated under Part 121. The expected service life of a pre-1969 type certificated airplane has been prolonged far longer than anticipated at the time higher flight recorder standards were adopted for post-1969 airplanes. The advantages of the additional parameters of recorded information have been demonstrated by those airplanes so equipped, and it is desirable that more specific information be obtained following an accident than is possible under current regulations.

B. Objectives and Legal Basis for the Rule

The objective of the amendment is simply to make commercial air transportation safer. This objective has been thoroughly discussed in the final rule and the regulatory evaluation.

The legal bases of the proposal are Sections 313(a), 314(a), 601 through 610, and 1102 of the Federal Aviation Act of 1958, as amended (49 USC 1354 (a), 1421 through 1430 and 1502); 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

C. Description of Small Entities Affected by the Rule

The entities are unscheduled air carriers subject to Part 121 of the FAR with nine or fewer airplanes. This is covered in detail in Section IV above.

D. Compliance Requirements of the Rule

The amendment requires that pre-1969 type certificated airplanes operated under Part 121 be equipped with digital flight recorders within 2 years of the effective date of the rule and that these recorders be upgraded to record 11 parameters of information within 7 years of the effective date of the rule.

E. Overlap of the Rule with Other Federal Rules

There are no other Federal rules that duplicate, overlap, or conflict with the amended rule.

F. Comments in Response to the Initial Regulatory Flexibility Analysis

In NPRM No. 85-1, the FAA certified that the proposed rule was not expected to have a significant economic impact on a substantial number of small entities for all categories of operators which would be affected by the rule. Consequently, an Initial Regulatory Flexibility Analysis was not required and none was prepared. The revisions to the cost estimates in the final rule resulted in the determination that the amendment could result in a significant economic impact on a substantial number of small entities for only one category of operator, the small unscheduled Part 121 air carriers. However, as discussed below, this is the result of the relatively low threshold value for determining a significant economic impact applicable to unscheduled operators in comparison to scheduled operators of similar equipment, and therefore the small unscheduled Part 121 air carriers are not expected to be any more adversely affected than their scheduled counterparts.

The FAA's original regulatory flexibility determination remains the same for all other categories of small entities.

G. Alternatives to the Proposal

The small entity nonscheduled Part 121 operators should be included in the rule, rather than excluded, because they operate the same types of airplanes as those operated by scheduled Part 121 operators. Further, Part 121 operators engage in common, rather than private, carriage of persons and property. The standards should be the same for all operators of similar equipment that hold out to the public as a common air carrier, regardless of whether their operations are scheduled or not. Finally, because unscheduled carriers operate the same types of airplanes as scheduled carriers, their operating costs are very similar for the same scale of operations. The $3,666 threshold value defining a significant economic impact for unscheduled operators

is substantially lower than the $52,546 and $94,094 thresholds applicable to scheduled carriers. However, this is because the vast majority of unscheduled operators are air taxis that operate under Part 135 with much smaller and less costly piston-powered airplanes. Although small entity unscheduled Part 121 operators will exceed their low threshold value if they convert two or more airplanes, they should be no more adversely affected than the scheduled small entity Part 121 operators because their costs are much more comparable to those of scheduled Part 121 operators than to those of unscheduled Part 135 operators.

CONCLUSION

For the reasons discussed in the preamble and based upon the findings in the Regulatory Evaluation, Regulatory Flexibility Determination, and Trade Impact Assessment located in the docket, the FAA has determined that this document: (1) Involves an amended regulation that is not major under Executive Order 12291; and (2) is a significant rule pursuant to the Department of Transportation Regulatory Policies and Procedures (44 FR 11064; February 26, 1979). In addition, it is certified under the criteria of the Regulatory Flexibility Act that this rule will not have a significant economic impact on a substantial number of small entities for all the affected categories of small entities other than the small, unscheduled Part 121 operators. A final Regulatory Flexibility Analysis has been prepared in accordance with Sections 604(a) and (b) of the Regulatory Flexibility Act for this category. A copy of the evaluation may be obtained by contacting the person identified in the "FOR FURTHER INFORMATION CONTACT" paragraph.

ADOPTION OF THE AMENDMENTS

Accordingly, Parts 91, 121, 125, and 135 (14 CFR Parts 91, 121, 125, and 135) are amended effective May 26, 1987.

The authority citation for Part 125 is revised to read as set forth below, and the authority citations following all sections in Part 125 are removed:

Authority: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

Amendment 125-9

Foreign Air Carriers and Operators of Certain Large U.S.-Registered Airplanes

Adopted: May 19, 1987 **Effective: August 25, 1987**

(Published in 52 FR 20026, May 28, 1987)

SUMMARY: These amendments require that U.S.-registered aircraft leased by foreign persons be maintained in accordance with acceptable maintenance standards and clarify certain rules to preclude the commingling of noncommon (private) and common-carriage operations. These amendments are necessary to upgrade certain regulations regarding the leasing of U.S.-registered aircraft by foreign persons and to clarify the inspection and maintenance requirements applicable to foreign persons conducting private and common-carriage operations with U.S.-registered airplanes.

FOR FURTHER INFORMATION CONTACT: Messrs. David L. Catey, Manager, Project Development Branch (AFS-240), Air Transportstion Division, telephone (202) 267-3747, or Bob Baker, Manager, Project Developmnt Branch (AFS-360), Aircraft Maintenance Division, telephone (202) 267-3788, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591.

SUPPLEMENTARY INFORMATION:

Background

On October 9, 1980, Part 125 of the Federal Aviation Regulations (FAR) was published in the *Federal Register* (45 FR 67214). With certain exceptions, not germane to the current discussion, Part 125 up to now has applied to the operation of all U.S.-registered airplanes having a passenger seating configuration of 20 or more, or a maximum payload capacity of 6,000 pounds or more, unless they are required to be operated under the rules of Part 121, 135, or 137 of the regulations.

Although Part 125 was not intended to provide acceptable safety levels for common-carriage operations, the inspection programs and maintenance requirements of § 125.247 currently apply to U.S.-registered airplanes operated outside the United States by foreign persons. This results because Part 125 governs operation of a U.S.-registered airplane of the prescribed size unless that operation is required to be conducted under the rules of Parts 121, 135, or 137. Accordingly, up to now there has been no exclusion from Part 125 for operators under Part 129—Operations of Foreign Air Carriers.

At the time Part 125 was published, the FAA was considering rulemaking to revise Part 129 to cover inspection and maintenance requirements for U.S.-registered aircraft. Requiring foreign air carriers to comply with Part 125 immediately was deemed inappropriate in light of the possibility of change to Part 129. Consequently, in adopting Part 125, the agency established a deferred compliance date of January 1, 1983, for foreign air carriers. By Amendments 125-4 (47 FR 44718; October 12, 1982), 125-5 (49 FR 34815; Sepember 4, 1984), 125-6 (51 FR 873; January 8, 1986), and 125-7 (52 FR 6956; March 6, 1987), the agency extended the January 1, 1983, compliance date to September 1, 1984, February 28, 1986, February 28, 1987, and February 29, 1988, respectively, to provide sufficient time for completion of this rulemaking.

Subsequent to the adoption of Part 125, the agency has carefully monitored the operating experience of large U.S.-registered airplanes operated under Part 125. The operating experience can be divided into two main areas of interest. First, the frequency with which foreign air carriers operate U.S.-registered airplanes under lease has shown a marked increase. These lease agreements are desirable since they provide a means for U.S. air carriers to arrange for use of these airplanes during periods of reduced traffic levels. The second area concerns the distinction between common carriage and noncommon carriage operations.

Most foreign air carriers and foreign persons engaged in common-carriage operations have aircraft maintenance program requirements adopted by their domestic governments which are consistent with the international standards in Part I of Annex 6 to the Convention on International Civil Aviation Organization (ICAO). ICAO, Annex 6, requires each operator to comply with the terms of the aircraft's certificate of airworthiness and to maintain the aircraft in an airworthy condition. To meet these requirements, each foreign operator of a U.S.-registered aircraft used in common carriage must ensure that the aircraft is maintained by a qualified organization with a well-trained staff and adequate

workshops, equipment, and facilities. That organization must also have appropriate maintenance manuals, records, and procedures regarding training, inspection, and release of the aircraft. However, some countries may not have requirements completely consistent with the ICAO aircraft maintenance program requirements. This means that U.S.-registered airplanes operated by foreign air carriers or persons from those countries might not meet those international standards. To allow operation of these aircraft would be inconsistent with U.S. international obligations for aircraft of its registry. These amendments will therefore require compliance with the United States' international airworthiness obligations.

Concerning the second main aspect of the operating experience of large U.S.-registered airplanes of the size covered by Part 125, that part was designed to provide a regulatory scheme for an appropriate level of safety for airplanes not used in common carriage. This regulatory intent is stated explicitly in § 125.11. That section prohibits common carriage by a Part 125 certificate holder and declares that any person holding an air carrier operating certificate is ineligible for a certificate under Part 125. The sole exception to the principle that Part 125 is intended to apply only to noncommon carriage to date has been the case of a foreign person common carrier compelled to operate under the rules of Part 125 by operating a U.S.-registered airplane of the size covered by that part. These amendments eliminate that exception by expanding Part 129 to apply to each foreign operator of a U.S.-registered aircraft engaged in common carriage operating either into and out of or wholly outside the United States.

On December 10, 1985, the FAA published Notice No. 85-24 (50 FR 50588, December 10, 1985) to resolve the issues discussed above. The public comment Period closed on April 10, 1986.

Analysis of Comments

Seven public commenters responded to Notice No. 85-24. Two commenters supported the proposals to preclude the commingling of noncommon (private) and common-carrer operations. No comments were received with respect to the operational as opposed to the airworthiness and maintenance proposals of Notice No. 85-24. Thus, to preclude the commingling of noncommon (private) and common-carriage operations, new §§ 121.3(i), 125.11(c), 129.1(b), 129.11(a)(4) and (c), 135.11(c), and a new paragraph 5 of Section V. A., of paragraph (b) of Appendix A of Part 129 are adopted as proposed. Also, the proposals to revise §§ 125.1(a) and (b)(1), (3), and (4), 129.1(a) and 129.11(a) are adopted as proposed.

Section 125.1(d) is removed because the cutoff date of January 1, 1983, is obsolete, and the reference to paragraph (d) is also removed from § 125.1(a).

Proposed § 125.11(a) is revised by replacing the words "is authorized to operate aircraft under an operating certificate or operations specifications" with the words "holds the appropriate operating certificate and/or operations specifications necessary to conduct operations." This revision is consistent with terminology used in SFAR 38-2. Proposed § 125.11(a) is adopted with this modification.

Several commenters recommend that proposed § 129.14(b) be revised to require a maintenance program that would be equivalent to the continuous maintenance program required for Part 121 air carriers. It was suggested that a more specific reference is needed to address the significant maintenance aspects of Part 121 which would clearly exclude an obligation for the foreign air carrier to follow other certification requirements of Part 121 or 135. To the same general effect is the suggestion of another commenter who proposes a change to language in proposed § 129.14(b) to require that the program selected meet the requirements consistent with § 121.367 or 135.425 as appropriate. The FAA does not agree with these suggestions. A primary objective of the amendment is to require that a U.S.-registered aircraft leased by a foreign person be maintained in accordance with maintenance standards that are consistent with the requirement of the country which is a member of the Internationl Civil Aviation Organiztion. The FAA considers it would be inappropriate to specify all the applicable FAR sections or to limit an operator's maintenance program requirements to those two sections because an acceptable maintenance program must be in compliance with numerous other sections of Parts 121 and 135, as appropriate.

Another commenter questions who would be responsible for airworthiness control when a foreign operator under Part 129 operates a U.S-registered aircraft. Proposed § 129.14(a) and (b) would require each foreign person who operates a U.S.-registered aircraft in common carriage to meet prescribed maintenance requirements. Aircraft maintenance programs which are consistent with the international standards in Part I of ICAO Annex 6 require each operator to comply with the terms of the aircraft's

certificate of airworthiness and to maintain the aircraft in an airworthy condition. The Federal Aviation Regulations prescribe airworthiness standards for all U.S.-registered aircraft operating within or outside the United States, irrespective of the person operating the aircraft. This includes U.S.-registered aircraft operated by a foreign air carrier or foreign person.

The FAA has further reviewed the maintenance requirements proposed in § 129.14(b) and the comments received concerning the proposed wording of that paragraph. As written, the proposal creates a misunderstanding as to what would constitute an acceptable maintenance program as required by proposed 129.14(a). In addition, proposed § 129.14(b) would have provided that U.S.-registered aircraft operated by foreign persons would be adequatley maintained in accordance with either Part 121 or Part 135, without regard to or consideration of the maintenance standards that are consistent with the requirement of the country which is a member of the ICAO. Further, specific requirements of a maintenance program would best be identified in an Advisory Circular which could address specific requirements for a particular type of operation. Based on the foregoing, § 129.14 has been revised to impose a general requirement that U.S.-registered aircraft operated in common carriage by any foreign air carrier or any foreign person be maintained in accordance with a maintenance program which has been approved by the FAA Administrator. The specific requirements of the program will be addressed in an Advisory Circular that will provide guidance as to what would constitute an approved maintenance program. The Advisory Circular will be disseminated to FAA International Field Offices and Flight Standards District Offices.

Two commenters recommend that the maintenance rules of Part 43 be revised to include reference to Part 129. The FAA agrees and has adopted this recommendation by amending § 43.13(c).

Regulatory Evaluation

These amendments clarify the maintenance and minimum equipment list requirements applicable to U.S.-registered aircraft operated by foreign persons. Section 129.11 (a)(4) will impose only a minimal cost by requiring that the registration markings of each U.S.-registered aircraft be listed on the foreign carrier's part 129 operations specifications.

Two commenters support the proposed sections that would preclude the comingling of noncommon (private) and common-carriage operations, and no opposing comments were received. A minimal cost may result from the adoption of these amendments. A remote possibility exists that one or several transport category aircraft may be currently listed on both a Part 125 (private-carriage) operations specifications and either a Part 121, Part 129 or Part 135 (common carriage) operations specifications. Although such simultaneous listing of an aircraft on both private- and common-carriage operations specifications is contrary to current FAA administrative practices, a minimal cost may be incurred by the FAA and a few aircraft operators to delist an aircraft from either the private-carriage operations specifications or the common-carriage operations specifications. In addition, the few operators who may be using the same aircraft in private- and common-carriage operations under a simultaneous listing may lose some utilization of their aircraft as a result of this rule. Any costs that would be incurred are expected to be very minor, however, because of the very limited extent of this practice.

New § 129.14(b) provides for the use of a minimum equipment list by a foreign air carrier or foreign person using any U.S.-registered aircraft in common-carriage operations. The provisions of § 129.14(b) are more explicit and appropriate to common-carriage operations than the minimum equipment list requirements provided in § 91.30, which were reinstated effective March 13, 1986 (50 FR 51188, December 13, 1985), in Amendment 91-192. Both Amendment 91-192 and these amendments preclude the necessity for exemptions, thereby reducing the administrative burden of both foreign air carriers and the FAA.

Conclusion

These amendments will facilitate the agency's maintaining distinctions among Parts 91, 121, 125, 129, and 135 of the regulations so that all U.S.-registered aircraft meet appropriate standards applicable to the type of operations (air transportation versus other air commerce) being conducted. They also provide for minimum equipment list use by foreign air carriers and other foreign persons using any U.S.-registered aircraft in common carriage operations without the necessity of obtaining an exemption. These amendments will have either no impact or a small positive impact on trade opportunities of U.S. and foreign persons who may wish to enter into aircraft lease agreements. Accordingly, for these reasons

and those discussed under the heading entitled "Regulatory Evaluation," the FAA has determined that these amendments are not considered to be significant under DOT Regulatory Policies and Procedures (44 CFR Part 11034; February 26, 1979) and are not major as defined in Executive Order 12291. For these reasons and becasuse these amendments will result in negligible costs, I certify that, under the criteria of the Regulatory Flexibility Act, the amendments will not have a significant economic impact on a substantial number of small entities. The overall economic impact of this rulemaking is so minimal that it does not require a full regulatory evaluation. In addition, benefits to this agency and some foreign operators are expected to secrue from the elimination of the need for certain exemptions.

Adoption of the Amendments

In consideration of the foregoing, Parts 43, 91, 121, 125, 129, and 135 of the FAR (14 CFR Parts 91, 121, 125, 129, and 135) are amended effective August 25, 1987.

The authority citation for Part 125 continues to read as follows: *Authority:* 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

Amendment 125-10

Cockpit Voice Recorders (CVR) and Flight Recorders

Adopted: June 30, 1988 **Effective: October 11, 1988**

(Published in 53 FR 26134, July 11, 1988)

SUMMARY: The FAA amends its regulations to require digital flight data recorders and cockpit voice recorders (CVRs) to be installed in a broad category of airplanes and rotorcraft operated by air carriers and commuters, as well as in selected aircraft operated in general aviation. The amendments are in response to legislation which mandates the FAA to amend its flight recorder and CVR requirements in accordance with recommendations from the National Transportation Safety Board (NTSB). The intent of this rulemaking is to provide more information to accident investigators in determining the causes of accidents and the measures needed to correct the causes. In addition, the FAA also requests additional comments regarding the general aviation requirements.

DATES: *Effective date:* October 11, 1988.

Comments on the Part 91 requirements must be submitted on or before October 11, 1988.

Compliance Date: October 11, 1991.

ADDRESSES: Comments on the Part 91 requirements should be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC-10), Docket No. 25530, 800 Independence Avenue, SW., Washington, DC 20591. Comments delivered must be marked Docket No. 25530. Comments may be examined in Room 915G weekdays between 8:30 a.m. and 5 p.m., except on Federal holidays.

FOR FURTHER INFORMATION CONTACT: Frank Rock, Technical Analysis Branch (AWS-120), Aircraft Engineering Division, Office of Airworthiness, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; Telephone (202) 267-9567.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking on flight recorder and CVR requirements on February 12, 1988 (Notice No. 88-1, 53 FR 4314). The proposed rule was primarily based on recommendations from the NTSB issued on June 19, 1987. FAA rulemaking on these requirements was mandated by legislation on December 22, 1987, in the Appropriations Act, 1988, (Pub. L. 100-202) and on December 30, 1987, under the Airport and Airway Safety and Capacity Expansion Act of 1987, Title III, Section 303(c) (Pub. L. 100-223).

The Appropriations Act required the FAA to expand existing CVR and flight recorder requirements "to smaller sizes of commuter air carrier aircraft" and to require CVR and flight recorder "retrofits on certain types of existing commuter air carrier aircraft. . . ."

The Airport and Airway Safety and Capacity Expansion Act required the FAA to initiate rulemaking "to consider the use of cockpit voice recorders and flight data recorders on commuter aircraft and other aircraft, commensurate with the recommendations of the National Transportation Safety Board."

The NTSB issued its safety recommendations in response to a number of significant events which had occurred since its previous recommendations issued in August 1982. These events were FAA's flight recorder and CVR rule changes issued March 25, 1987; the technological development of solid-state flight data recorders (SFDR); the continued growth of the commuter air carrier industry; revisions to Part 23 of the Federal Aviation Regulations (FAR) (14 CFR Part 23) which defined a commuter category airplane and established certification requirements for commuter category airplanes; and the adoption by the International Civil Aviation Organization (ICAO) of revised flight recorder and CVR standards.

The FAA used the NTSB recommendations of June 19, 1987, as an appropriate background to discuss extending and updating its flight recorder and CVR rules. The rules on CVR and flight recorders

had been last amended March 25, 1987 (Amendment Nos. 91-199, 121-191, 125-8, 135-23; 52 FR 9622). In simplified terms, the 1987 amendments required that FAR Part 121 operators update certain of their airplanes over a specified time period with digital flight recorders that have 6, 11, or 17 data parameters depending on the date of type certification or manufacture. Parts 91 and 125 were also amended by requiring that any operator who has installed approved flight recorders and approved CVRs shall keep the recorded information for at least 60 days after an accident or occurrence requiring immediate notification to the NTSB. The 1987 amendments extended Part 135 voice recorder requirements which applied to any turbojet airplane having a passenger seating configuration of 10 seats or more to any newly manufactured multiengine, turbine-powered airplane that was certificated to carry six or more passengers and required to have two pilots. The 1987 amendments did not require flight recorders for operations conducted under Part 135. They did not require voice recorders or flight recorders for operations conducted under Parts 91 and 125. They did not require flight recorders for helicopters.

The NTSB wanted broader application of the requirements than those established in the 1987 amendments, and the NTSB recommended that the requirements, including parameter requirements, be updated to cover technological improvements in CVR and flight recorder equipment. Through the aforementioned legislation, Congress agreed.

As stated in the preamble to the proposed rule and in the NTSB recommendations, the need for updated and expanded regulations on the installation and use of flight recorders and voice recorders is twofold. First, technological advances in cockpit equipment have greatly increased the potential for accumulating information on the flight characteristics of an aircraft at the time of an incident or accident. However, unless aircraft equipped with new electronic display systems (i.e., "glass cockpits") are also equipped with flight recorders that can capture the flight information and from which investigators can retrieve that information, the information is lost. Therefore, a major objective of this rulemaking is to upgrade the parameters and flight recorder and voice recorder standards to accommodate the most sophisticated systems now being installed in aircraft. Secondly, previous flight recorder and voice recorder requirements have not been applied to significant sectors of air transportation operations.

In recent years the commuter air carrier fleet has grown substantially and its growth is expected to continue. The 1987 annual report of the Regional Airline Association (whose membership consists primarily of commuter air carriers) estimates that more than 61 million passengers will be carried by members of that association in 1997. The growth in commuter air transportation has resulted in newly manufactured aircraft designed specifically for the commuter market. While these new airplanes have a take-off weight in excess of 12,500 pounds, they often have a seating configuration of less than 30 passenger seats and payloads of 7,500 pounds or less, which means they are operated under Part 135. Until now Part 135 has had no flight recorder requirements. Therefore, vital accident data from commuter airline accidents has not been available.

The NTSB safety recommendation cites several recent commuter air carrier accidents in which investigations revealed a lack of information that would have been pertinent to determining the causes. Although the investigations produced a number of safety recommendations based on evidence of potentially hazardous conditions and practices, the specific flight crew actions or inactions, environmental conditions or equipment failures that may have caused the accidents could not be positively determined. Therefore the NTSB's safety recommendations towards preventing recurrence could not be as definitive as possible. The NTSB has indicated that in these accidents if flight recorder information had been available, specific deficiencies in flight crewmembers performance or mechanical failures or malfunctions could have been determined. Without flight recorder information, accident investigators are severely limited in definitively assessing causes. Therefore, the FAA has added flight recorder requirements to Part 135 and extended the voice recorder requirements in Part 135 to specific types of airplanes and rotorcraft.

Part 91 and Part 125 operations have had neither flight nor voice recorder requirements. The lack of information poses the same problem to investigators as in commuter operations. Therefore, this rulemaking extends flight recorder and voice recorder requirements to specific types of airplanes and rotorcraft being operated under Part 91 and specific types of airplanes operated under Part 125.

In addition to the above, the NTSB recommended that all newly manufactured aircraft and new cockpit voice recorder installations be designed to allow for uninterrupted recording from boom or

mask microphones and headphones for each flight crewmember station and from an area microphone on dedicated channels of the CVR. The performance of CVR installations of this kind where the audio signal of each crewmember station is continuously recorded on a dedicated channel provides much clearer recorded information for investigators than the standard cockpit area microphone (CAM). Therefore, this rulemaking includes amendments to Parts 23, 25, 121, 125, and 135, to require the NTSB recommended capability on newly manufactured aircraft and on aircraft on which new cockpit voice recorders are installed and to require the use of that capacity where it already exists.

In the interest of safety and in accordance with the Congressional mandate and NTSB recommendations, the FAA is extending and updating its regulations in flight recorders and voice recorders. This action is consistent with the requirements of § 601(b) of the FA Act that the FAA perform its powers and duties ". . .in such manner as will best tend to reduce or eliminate the possibility of, or recurrence of, accidents. . . ."

Overall this rulemaking accomplishes the following significant changes:

(1) It establishes flight recorder requirements for certain aircraft operated under Parts 91, 125, and 135.

(2) It establishes cockpit voice recorder requirements for certain aircraft operated under Parts 91 and 125, and extends and revises voice recorder requirements under Part 135.

(3) It upgrades the requirements and parameters for flight recorders to the level of the most sophisticated systems installed in aircraft. The new parameters and requirements affect certain aircraft operated under Parts 121, 125, and 135.

(4) It requires uninterrupted sound recording capability in cockpit voice recorders under Parts 23 and 25 and specifies use of this capacity under the operating rules of Parts 121, 125, and 135.

(5) It revises CVR and flight recorder airworthiness standards in Part 25; establishes flight recorder installation requirements in Parts 23, 27, and 29; and establishes CVR requirements in Parts 23 and 27.

COMMENT DISCUSSION

The FAA received 52 comments on the NPRM. Thirty-one comments opposed the proposed rule; nine supported it; two supported it with reservations.

The rest of the comments did not express opposition or support. At least 19 comments addressed specific issues raised by the proposed rule. The categories of commenters included airport authorities, state governments, operators of airplanes and helicopters, manufacturers, and foreign air transportation companies. Of the associations representing air transportation interest groups, comments were received from the Air Line Pilots Association (ALPA), the Air Transport Association (ATA), General Aviation Manufacturers Association (GAMA), Airport Operators Council International, the National Air Transportation Association (NATA), and the Regional Airlines Association (RAA). Commenters who opposed the rule were primarily operators conducting operations under Part 135 (or Part 91), particularly operators of helicopters, as well as ATA and NATA. Categories of commenters supporting the rule were manufacturers, state governments, and airport authorities, the National Transportation Safety Board (NTSB), and the RAA.

Several commenters presented recommendations and raised concerns over specific requirements in the rule. The following categories of issues were raised and are discussed separately below:

(1) Part 121 requirements

(2) Part 91 and Part 135 requirements

(3) Specific technical requirements

(4) Comments beyond the Scope of the Notice.

Part 121 Requirements

The Air Transport Association (ATA) on behalf of its member airlines submitted a number of objections to the proposed changes in Part 121 and in some cases to the proposed parallel changes in Part 25. Several of ATA's objections were also raised by other commenters. Overall opposition to the proposed changes was based on two general arguments. First, the ATA argued that the Congressional language cited in the NPRM as a primary basis for the proposed changes did not identify

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Part 121 air carriers. Second, they argued that "the NTSB and FAA have not adequately justified the Part 121 proposals for further expansion of flight recorder requirements beyond those in Amendment 121-91." ATA also stated that the 45-day comment period was too short for its member airlines to "provide the type of technical and economic impact information needed to develop final credible technical and cost analyses," and recommended that the FAA withdraw and reconsider the proposed amendments to Parts 25 and 121.

ATA and others specifically commented on technical concerns with Part 121 proposals. Comments of a purely technical nature are dealt with elsewhere in this preamble. The remaining Part 121 comments (mostly from ATA) are summarized as follows:

- Of the six new developments cited by FAA in Notice 88-1 as justification for the proposed additional requirements, none justify the proposed Part 121 changes.
- Notice 88-1 did not include any discussion on "major rule", "significant rule" requirements under Executive Order 12291 and DOT policy, respectively.
- There are significant differences between the FAA/NTSB proposed flight recorder parameters and the ICAO standards which ATA says are "recommended standards only" which are "in the process of being revised."
- Adoption of 32 parameter flight recorder requirements for newly manufactured airplanes rather than last year's requirement for 17 parameter flight recorder for newly manufactured airplanes will create an unnecessary administrative and logistics burden.
- The proposed additional parameters could exceed the capacity of digital flight data acquisition units "denying airline use of flight recorder information for routine maintenance and operations analyses, some of which are required by the FAA."
- The relationship of the proposed requirements to the rules adopted in Amendment 121-191 is confusing and potentially disruptive and costly to airline operations especially when considered with other FAA requirements already adopted or under consideration (e.g. windshear, TCAS requirements). Related to this ATA comment was a comment by McDonnell Douglas Aircraft Co., which indicated that changing "regulatory requirements on systems such as flight recorders on an annual basis . . . makes planning very difficult and expensive."

ATA offered an alternative to the FAA proposal. ATA suggests that for a retrofit, additional parameters be required only when the airplane is already equipped with "an ARINC 717 digital flight data acquisition unit (DFDAU) with the ARINC buses containing the (a number to be later determined) additional parameters *already* converted to it." For newly manufactured airplanes ATA would follow the same pattern except that additional parameters above the 17 parameters of Amendment 121-191 would be recorded "on a space availability basis without impacting existing airline recording programs. . . ."

The FAA's Response:

The FAA does not agree with ATA's interpretation of the Congressional mandate. Given the overall legislative history of Public Law 100-223, FAA believes that the Congressional intent is to ensure safety by making available to the NTSB whatever data is necessary for accident investigation if acquiring that data is technologically feasible. Congress stated this intent by ordering the FAA "to initiate a rulemaking proceeding to consider the use of cockpit voice recorders and flight data recorders on commuter aircraft *and other aircraft, commensurate with the recommendations of the National Transportation Safety Board.*" (Emphasis supplied.) In its June 19, 1987, letter to the FAA, the NTSB stated its requirements which covered 14 CFR Parts 23, 25, 91, 121, and 135. FAA proposed to meet those requirements in Notice 88-1, as directed by Congress. Comments submitted by the Board did not indicate that the proposed Part 121 requirements exceeded the bounds of what the Board determines as necessary information for conducting accurate accident investigations.

ATA is correct that the normal paragraph addressing "major rule" under Executive Order 12291 and "significant rule" under DOT policy was omitted - inadvertently - from the NPRM. Nonetheless, the potential costs were fully discussed in the preamble (and in a full economic evaluation in the docket) and the substance of that discussion indicated that the proposed rule would not be considered major under the Executive Order. Further, the overall preamble discussion made it clear that the proposals were significant within the meaning of the Department of Transportation's Regulatory Policies and Procedures.

The 1987 Amendments to Part 121 did not increase the parameters listed in Appendix B of that part. NTSB has stated in its recent recommendations that Appendix B should be updated to expand the parameters list and define new parameters, improved accuracies, ranges, and sampling intervals so that flight recorder standards are consistent with the capabilities of the most advanced electronic display systems. As stated by NTSB, "The introduction of the Airbus A320 with its fly-by-wire technology will present new challenges in accident investigation that will require post accident information of the quantity and quality that goes far beyond the current minimum standards of Appendix B."

In response to the NTSB recommendations, this rulemaking updates the parameter list to meet the requirements of the most advanced cockpit systems if installed and to require the best available flight recorder technology for newly manufactured airplanes operated under Part 121. The requirement for flight recorder parameters in addition to the 17 required by the 1987 amendments applies only to aircraft manufactured after October 11, 1991, or those already equipped with specific ARINC equipment. This allows adequate time for the required installation of the latest flight recorder equipment as part of the manufacturing process which should cause no manufacturing delay and only minimal cost.

While ATA describes the proposed tie-in with existing ARINC 429 equipment (or an equivalent) as a retrofit requirement, it is not the normal mandatory type retrofit requirement applicable to all or certain specified airplanes operated under Part 121 or Part 135. The final rule clarifies the FAA intent in this regard (discussed under Technical Comments portion of this preamble) and as adopted the rule will apply only where stated equipment is already installed in an airplane and where data is readily available so that it can be accessed with virtually no burden on Part 121 operators, either in lost airplane time or other costs.

In consideration of other objections raised by ATA, that extending the parameters from 17 to 32 (or higher, by ATA's count) is too great a change too soon, that Part 121 operators are being required to make other equipment changes at the same time, and that the proposed parameters were not consistent with those recommended by ICAO, and in consideration of the comments submitted by the NTSB, the FAA has done the following: (1) extended the effective date of the requirements to 3 years instead of the proposed 2 years; and (2) reduced the number of mandatory parameters to 28 and made the other highly desired parameters optional where feasible.

Parts 91 and 135 Requirements

Except for the Regional Airline Association's agreement with most of the proposed Part 135 amendments, virtually all of the operators who commented on these requirements opposed them. Specific technical comments are discussed below. Typical of the more general opposing comments was the comment of the North Dakota Aviation Council which stated that the FAA had "expanded the intent of Congress" in proposing CVR and flight recorder requirements for certain general aviation operations under Part 91 and on-demand operations under Part 135. The National Air Transportation Association (NATA) also accused the FAA of expanding the Congressional mandate and further stated that nowhere in the proposal "can a case be made for a quantitative increase in safety benefit for requiring CVR's in the types of aircraft typically operated in the Part 135 charter fleet."

One commenter pointed out that a 2-year compliance period for the installation of CVR's is inadequate. From the commenter's viewpoint, most of the affected aircraft require a "heavy" inspection only every 5 to 6 years. It is during this inspection that it would be most appropriate to install the CVR.

Several commenters asserted that where an aircraft is newly manufactured to a type design of long standing, the attributes and operational history are already well known and it is unlikely that the NTSB will obtain the kind of information it seeks from accident investigations. These commenters also asserted that the past safety record did not justify the new requirements and that because of the nature of on-demand and general aviation operations the costs are disproportionate since they cannot be spread out over thousands of flight hours or hundreds of thousands of passengers boarded each year.

Some of the most vigorous comments adverse to the proposed requirements were received from helicopter operators. They, too, thought that the FAA had exceeded the Congressional mandate, that none of the cited accidents or other justification involved helicopters, and that the potential costs for helicopter operators far exceeded any potential benefits to the overall aviation industry.

The Regional Airlines Association stated that there is no justification for requiring retrofit of the 32-parameter flight data recorder on 20-30 seat airplanes under Part 135 when no such retrofit

requirement was proposed for Part 121. RAA indicated that while the costs would be substantial, it could not provide specific estimates because they would vary from airplane to airplane depending on the amount of wiring already installed in the airplane.

The FAA's Response:

As discussed previously, the FAA does not agree that it has exceeded the Congressional mandate or that the new CVR and flight recorder requirements for Part 91 operators and for non-scheduled Part 135 operators cannot be justified. Accident investigators face the same problems in determining the causes of accidents, whether the accidents involve scheduled commuter operations, nonscheduled operations, or general aviation operations. New airplanes used in all of these operations employ state-of-the-art avionics and control systems; yet operators have not been required under Parts 91 and 135 to install flight recorders which would provide data to accident investigators. Post accident documentation, such as switch and instrument positions, that have proven vital in past investigations is not available with the new systems, thus increasing the difficulty in determining the cause of an accident.

Furthermore, many airplanes of the same type are used in Part 91 operations and in Part 135 operations. Therefore, any accident data collected from an accident of one of these airplane types has application for operations conducted under both parts. Also, an individual airplane may be used in operations conducted under both parts. If an airplane is used in operations under both parts, the Part 91 requirements would not be as burdensome as suggested by some commenters since in many cases the airplane would already be subject to Part 135 requirements. Also, because of the potential for use of an airplane type under both Parts 91 and 135, the used aircraft market ultimately benefits when airplanes are equipped so that they can move back and forth between different operating rules.

Accidents cited in the NPRM (which included operations conducted under Parts 91 and 135) illustrate the problems accident investigators encounter when aircraft are not equipped with flight or voice recorders. In such cases, investigators rely on interviews with fellow crewmembers, training records, FAA surveillance, cockpit standardization, and additional operational factors. Although the cause of an accident may be determined through these investigative efforts, the process may be long and costly in terms of lives and property. Time may be critical, particularly if the cause of an accident is an airworthiness factor.

The rule does recognize differences in accordance with the seating capacity of the aircraft. In Part 91, flight recorders are required for aircraft (both fixed-wing and rotorcraft) having a passenger seating configuration of 10 or more manufactured after October 11, 1991. The flight recorders must have 17 required parameters for airplanes and 22 for rotorcraft. In Part 135, flight recorders are required for aircraft (both fixed-wing and rotorcraft) having a passenger seating configuration of 10-19 seats that are brought onto the U.S. register after October 11, 1991. The flight recorders must have 17 parameters for airplanes and 22 for rotorcraft. In effect, Part 91 and Part 135 flight recorder requirements for these size aircraft apply only to newly manufactured aircraft. No retrofit of existing U.S. registered aircraft of this size is required for flight recorders.

In Part 135, airplanes having a passenger seating configuration of 20 to 30 seats and rotorcraft having a passenger seating configuration of 20 or more seats must be equipped with flight recorders after October 11, 1991. This is a retrofit as well as a requirement for newly manufactured aircraft. The NTSB in its comment agreed that it might be impractical to require 20-30 passenger airplanes to be retrofitted with 32 parameter flight data recorders, as proposed. In light of all the information received, the FAA has changed § 135.152(b) to require that affected aircraft be retrofitted with either 11-parameter or 17-parameter flight recorders (depending on the type certification date), except that those airplanes manufactured after October 11, 1991, must be upgraded to 28 parameters.

Clearly the flight recorder requirements for the larger aircraft being operated under Part 135 are more stringent than those for the smaller aircraft. Most, if not all, nonscheduled operations conducted under Part 135 use aircraft with a passenger seating configuration of less than 20 seats. Such aircraft are not required to be retrofitted with flight recorders. However, they are required to be equipped with voice recorders. Since the cost of installing voice recorders is substantially less than that of flight recorders, the FAA does not expect the voice recorder requirements to impose a significant burden on small operators.

With regard to comments about the inadequacy of a 2-year period to reasonably accomplish the Part 91 retrofit of CVR's, the FAA concurs. Accordingly, the FAA has provided a 3-year period to effect this retrofit. Recognizing, however, that some operators may not conduct a "heavy" inspection or overhaul in this period, the regulatory language provides that the Administrator, for good cause, may authorize extension of the compliance time to accommodate such maintenance schedules. A request for extension of the compliance time must be accompanied by a demonstration of good cause and must specify a date for the operator's completion of the retrofit of the CVR.

Technical Comments

A number of commenters provided detailed comments on the technical aspects of the new rules. Any such comments that address the substance of the rule are discussed below. Comments that point out printing errors, suggest non-substantive minor language changes, or suggest changes to make the rules internally consistent were considered and the appropriate changes were made. However those changes are not discussed in detail.

A number of commenters pointed out that, although the preamble to Notice 88-1 specifically discusses a new requirement for "hot mic" recording, the rule language specifies types of microphones but does not contain a "hot mic" requirement. Suggestions for appropriate rule language were provided. To correct this omission in the final rule, §§ 23.1457(c)(5) and 25.1457(c)(5) have been added to make it clear that all sounds received by the microphone must be recorded without interruption. In addition, §§ 121.359(e), 125.227(e), and 135.151(c) have been changed to clarify that §§ 23.1457(c)(5) and 25.1457(c)(5) apply to airplanes manufactured after October 11, 1991, and to airplanes on which a new cockpit voice recorder has been installed after October 11, 1991. One commenter stated that proposed § 25.1459(e) is unnecessary. This new paragraph requires evaluation of novel or unique design or operational characteristics of new aircraft to determine if additional parameters should be recorded on the flight recorder for that aircraft. The commenter is correct that additional parameters could be proposed as Special Conditions for that aircraft. However, the language is being inserted into § 25.1459 as a rule of general applicability so that as part of a review of airworthiness requirements for initial certification, a review to assess the need for additional parameters will be conducted.

A commenter pointed out that, while proposed § 91.35(b)(1) requires aircraft manufactured after one year after the effective date to be prewired to accept any appropriate flight recorder, the proposed language does not specify the date by which such aircraft must be equipped with flight recorders. The FAA has reviewed proposed 91.35(b)(1) and a parallel requirement proposed in § 135.152(a) and has concluded that, even though the requirement might provide an economic incentive to manufacturers to begin equipping airplanes to accept flight recorders, the safety benefit comes from the installation of the recorders. Therefore proposed §§ 91.35(b)(1) and 135.152(a) have not been included in the final rule.

One commenter questioned the justification for applying the proposed rules to helicopters. This commenter proposed that if CVR and flight recorder requirements are applied to any helicopters, they should be applied only to large helicopters. The FAA does not agree that the large/small dividing line (small = 12,500 pounds or less maximum certificated takeoff weight) is the appropriate determining factor for requiring or not requiring CVR and flight recorder equipment. As with airplanes, the FAA considers passenger seating configuration a more meaningful measure of the need for requiring safety information collection devices such as CVR and flight recorders.

A number of commenters stated that the language of proposed §§ 121.343(e) and 125.225(c) does not accomplish the objective stated in the preamble to Notice 88-1. Some commenters stated that the proposed rule language "equipped with an ARINC 429 digital data bus" is itself inaccurate. Others stated that even if an airplane does have the ARINC 429 equipment, that equipment may be used in such a way that it would not, without a major retrofit, provide access to the information in the additional parameters as suggested in the NPRM. The FAA's intent in following through on this NTSB recommendation was to take advantage of the full capability of more advanced technology equipment when that equipment is already installed. There is no intent to require any retrofitting costs beyond the minimal cost of accessing readily available data. The final rule has been redrafted so that it clearly carries out the original intent. It now states that when a large airplane is equipped with a digital data bus and ARINC digital flight data acquisition unit or equivalent the airplane must be "equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium." The rule, as adopted, also clarifies that only those parameters "available on the digital data bus" must be recorded.

As mentioned previously, the ATA and several other commenters questioned the number of new parameters that would be required under Appendix B to Part 121 for newly manufactured aircraft. Commenters suggested that there were inconsistencies between the FAA's proposed parameters, NTSB's recommended parameters, and ICAO recommended standards. Commenters also indicated that to meet the FAA proposed requirement would in many cases overload the system so that operators would have to sacrifice present usage of flight recorder systems to provide them with important safety-related, day-to-day operating information. At the same time some commenters suggested additional parameters, not proposed, that normally would be considered beyond the scope of this rulemaking. In order to establish standards that most effectively use flight recorder capability, the FAA has decided to require 28 mandatory parameters under Part 121, Appendix B, Part 125, Appendix D, and Part 135, Appendix D for newly manufactured aircraft. The remaining parameters will be optional, to be accessed if the operator's system has adequate capacity. The non-mandatory parameters include additional parameters that were not proposed, such as TCAS, which were added at the recommendation of the NTSB.

The NTSB and other commenters raised questions concerning the adequacy of existing Technical Standard Orders (TSOs) for both cockpit noise recorders and flight recorders. While TSOs are necessarily relevant, they have not been made a part of this rulemaking. As part of its ongoing TSO program, the FAA will revise TSOs when changes are needed to upgrade the specifications for equipment required by this final rule. These efforts are already underway and are being coordinated with the Society of Automotive Engineers (SAE) and European Organization for Civil Aviation Electronics (EUROCAE).

Some commenters pointed out that the minimum 15-minute duration period for cockpit voice recorders proposed for § 91.35(e) is not consistent with the standard agreed to in Europe (EUROCAE). Others noted that proposed §§ 91.35(b)(2) and 135.152(b) would allow a flight data recorder with an 8-hour duration while the international community is considering a 10-hour minimum to be consistent with the current ICAO recommended practice. While the FAA recognizes that both proposed limits are less stringent than those mentioned by commenters (and less stringent than FAA's own minimums under Part 121), the FAA's intent is to apply CVR and flight recorder solid state technology and CVR and flight recorder requirements to general aviation operations at minimal cost. Since the technology is already available, the FAA anticipates that reasonably priced CVR and flight recorder equipment for general aviation aircraft will be available for installation well within the 3-year compliance period allowed in this rule.

One commenter objected to the requirement in proposed Appendix E to Part 135 that a rotorcraft with over 20 passengers have flight recorders with a 24-hour recording capacity. The commenter stated that most rotorcraft operate essentially short-haul journeys and that, therefore, an 8 to 10-hour capacity should be adequate. The FAA agrees, but no change is needed since Appendix E does not require a 24-hour recording capacity. In Appendix E, the recorded time requirement is not related to the time of individual flights, but to a 24-hour clock.

Several commenters objected to the requirements in §§ 121.359(e), 125.227(e), and 135.151(c) that when operating aircraft equipped to record uninterrupted audio signals received by a boom or mask microphone, flight crewmembers must use the boom microphone below 18,000 feet. Specific objections were as follows:

(1) The requirement would make better sense elsewhere in Part 121 where it would clarify that the boom microphone rather than the handheld microphone should be used when cockpit workload is high.

(2) Flight crewmembers might not be able to determine whether the CVR in a particular aircraft has a "hot mic" feature.

(3) It requires the boom microphone even though the smoke/oxygen mask microphone might be more appropriate.

(4) It would have an impact on those aircraft which have a separate hand microphone for the public address/cabin interphone systems.

(5) Hot boom microphones are not needed since acceptable recordings are provided by directional fixed mikes and high quality area mikes.

(6) The requirement could affect flight safety by causing fatigue on flight schedules with successive short stops.

The FAA does not agree that area microphones provide recordings that are equal to boom microphones. Boom or mask microphones with uninterrupted signals produce the most audible recordings. The purpose of the requirement is to require boom microphones (or smoke/oxygen mask microphones if needed) at times when the continual recorded information would be most useful if an accident or incident occurred. Flight crewmembers should be able to tell whether CVR in a particular aircraft has a "hot mic" feature. The use of the boom microphone is not likely to be a cause of flight crewmember fatigue in short hop schedules. The causes of such fatigue are well documented—airport congestion, low altitude weather, the number of arrivals and takeoffs—factors which create a need for the use of hot mics. The requirement should not affect public address/cabin interphone communications which have a dedicated channel.

GAMA stated that except for the longitudinal acceleration and stabilizer trim position or pitch central position parameters, proposed Appendix D of Part 91 and Appendix B of Part 135 are consistent with Aerospace Standard AS 8039 which was produced by a Society of Automotive Engineers (SAE) committee formed at the suggestion of the FAA and other government agencies. The committee had concluded that the value of the potential information from the two excepted parameters would not justify the cost. GAMA also pointed out that the recommendation of the SAE committee had been unanimous except for the NTSB representative. The FAA has determined that these two parameters are justified, since the NTSB in its June 19, 1987, letter stated a need for the information that would be provided by these additional parameters.

One commenter objected to the requirement in § 91.35(d)(2) that the CVR be operating during the checklist action. The requirement would pose a problem for small aircraft that have no external source of power and that would have to rely on battery power to operate the CVR. The commenter stated that for some aircraft this would be impractical. The FAA does not agree that the requirement would be impractical. It is essential that checklist actions be recorded since in the event of an accident, investigators must determine if the checklist action was properly conducted. Determining the adequacy of the power source is a certification procedure and thus the manufacturer or operator would have to show during the certification process that CVR operation would not interfere with emergency or other power needs. This showing should not impose any significant additional burden since airplanes of the size to which this requirement applies would either operate off of an auxiliary power source or have adequate backup power available.

One commenter objected to the "Resolution Readout" column which was added to Appendix B—Airplane Flight Recorder Specifications. According to the commenter, these specifications increase resolution requirements beyond the capability of equipment currently being used. The commenter states that "Compliance with the higher orders of resolution will require more complicated software in the recorder system and in the readout equipment, effectively making all current equipment obsolete."

The resolution readout column is included to make the FAA flight recorder appendices consistent with the proposed ICAO recommended standard. However, the resolution readout requirement is intended only for flight recorder equipment installed on newly manufactured airplanes. The final rule has been changed to make this clear by including a footnote to this column in each flight recorder appendix. Also, the new TSO for flight recorder standards will contain resolution requirements.

Comments Beyond the Scope of the Notice

The FAA received several comments which were recommendations or suggestions for considering alternatives or additions to the proposal. Some of these were requests that are beyond the scope of the notice while others appeared to be primarily informational. These types of comments are summarized below and responded to.

Two commenters requested that the rulemaking update maintenance requirements to cover flight recorders and cockpit voice recorders. The FAA does not consider that a specific amendment is needed in this regard because an air carrier's continued airworthiness maintenance program will automatically cover such equipment.

One commenter requested that the cockpit voice recorder requirements under Parts 91 and 135 include a requirement for underwater locator beacons to aid retrieval of the recorders from lakes and rivers. This requirement already exists for aircraft certification requirements.

One commenter requested that the rule include relief for continued aircraft operation if a flight recorder or CVR becomes inoperative. The commenter was concerned that a time lapse may occur

between the revisions to the Master Minimum Equipment List (MMEL) and the compliance date, also that MMEL lists may vary depending on who has responsibility for the particular aircraft MMEL. This rulemaking does not deal with minimum equipment lists and the problem suggested by the commenter, if necessary, would be handled under normal MMEL procedures.

A comment from a manufacturer stated that the NPRM implied "different sets of data between engine manufacturers." The commenter suggested additional engine information to be recorded for each engine:

N2 —High Rotor Speed
EGT—Exhaust Gas Temperature
TLA—Throttle Lever Position
N1 —Low Rotor Speed
WF —Fuel Low
CLA—Fuel Cutoff Lever Position

The commenter also suggested recording maintenance and status words from the electronic engine controls.

The FAA encourages including these additional parameters, as appropriate, but is not mandating them.

Construcciones Aeronauticas, S.A. (CASA) objected to the reference in the NPRM to two CASA C-212 accidents that occurred in 1987. CASA stated that some facts about the accident were incorrect in the NPRM and that the FAA should publish a correction. The FAA has checked the NTSB June 1988 recommendation letter and has determined that the NPRM accurately reflected the facts as they were stated by the NTSB in that letter.

A manufacturer of recorder equipment requested that the FAA consider the manufacturer's new type of cockpit recorder. Information on the recorder was submitted with the comment. The comment does not require an FAA response.

The Air Line Pilots Association (ALPA) comment, which was generally supportive of the proposal, requested a change in §121.343(e) which requires that required flight recorders "must be operated continually from the instant the airplane begins to takeoff roll until it has completed the landing roll at an airport." ALPA stated that this provision "hampers the collection of valuable data which can be used in evaluating the DFDR data." ALPA requested that the language be changed to require recorder operation to begin at the time of engine start to the time of engine shutdown at the end of the flight in order to provide "steady state" information. Two other commenters also requested that recording cover the ground operation phase.

No revisions to §121.343(e) were requested by NTSB or included in the proposed rule. The present Part 121 requirement was simply carried over to Part 91 and Part 135 requirements. A revision of the requirement is beyond the scope of this rulemaking action and would necessitate additional rulemaking proposals. However, most operators presently activate flight recorders at engine start and other operators who wish to record "steady state" data are encouraged to consider the ALPA comment.

ALPA also strongly opposes the "use of CVR recordings for any purpose other than pure accident investigation activities" and the "premature release" of CVR information during accident investigations.

One commenter stated a belief that "in recent years, because of the rapid growth of the airlines industry, training and experience levels have dropped. . . ." The commenter stated that the FAA should require additional training and safety measures rather than additional equipment. The FAA does not believe the situation is an either/or; FAA has taken action on training and other safety measures, for example, its windshear training proposal (52 FR 20560, June 1, 1987). In any event, consideration of additional pilot training and safety measures outside the area of recording equipment is beyond the scope of this rulemaking action.

Summary of Rule Changes

Significant changes between the proposed rule and the final rule are summarized below. These changes were discussed in the appropriate sections of the Comment Discussion above:

(1) The compliance dates have been extended from 2 years to 3 years.

(2) Pre-wiring requirements in §91.35 and §135.52 have been deleted.

(3) The requirements for airplanes currently equipped with a digital data bus are clarified in §§ 121.343(e) and 125.225(c).

(4) Certain of the parameters in Appendix B of Part 121 have been made optional.

(5) Aircraft required to be upgraded under §135.152(b) must meet the 11-parameter or 17-parameter flight recorder requirements (currently required of certain airplanes used under Part 121) except those manufactured after October 11, 1991.

(6) Requirements pertaining to the use of boom microphones have been clarified.

(7) The resolution readout column in each of the appendices has been made applicable only to aircraft manufactured after4 October 11, 1991.

The changes above were coordinated with the NTSB staff who have indicated agreement that this final rule meets the intent of the NTSB recommendations in its letter of June 19, 1987.

In addition to the above changes, Parts 23 and 27 have been revised to include airworthiness requirements for flight and voice recorders. In the proposal such airworthiness requirements were only in Parts 25 and 29, and all operators subject to flight and voice recorder requirements were referred to those parts. In the interest of consistency, the final rule includes airworthiness requirements for flight and voice recorders in Parts 23, 25, 27, and 29. References in the operating rule have been revised accordingly.

REQUEST FOR ADDITIONAL COMMENTS ON PART 91 REQUIREMENTS

Notwithstanding that the Part 91 requirements have been incorporated in this final rule, the FAA is still interested in receiving comments with respect to issues raised in Notice 88-1. The FAA is particularly interested in comments regarding the questions asked on page 4321 of the *Federal Register* publication of the notice (53 FR 4314). Therefore, a comment period of 90 days is being provided to allow the public to comment accordingly. The FAA will review all additional comments submitted and, within 1 year after the publication of this amendment in the *Federal Register*. will publish a document discussing all comments, presenting FAA findings based upon the comments, and proposing any revisions to the requirements contained herein, if necessary.

REGULATORY EVALUATION SUMMARY

The complete regulatory evaluation of the final rule is available in the regulatory docket. A discussion of those comments addressing the regulatory evaluation of the notice and a summary of the final regulatory evaluation are presented below.

Comments addressing the regulatory evaluation generally expressed concern about the costs of the proposed regulations, but provided very little detail in support of their conclusions. This was true with respect to both direct acquisition and installation costs, and indirect costs from factors such as reduced payload or aircraft range.

Some commenters stated that the amendments would impose a severe economic burden on small companies operating small aircraft for hire. The FAA is aware that the amendments will result in economic impacts. However, the Department of Transportation has been directed by the Congress to take these actions.

Some commenters misinterpreted the significance of the 10-year analysis period to mean that the FAA expected operators to spread their retrofit costs over 10 years. FAA's cost estimates were for total program costs over 10 years. In developing these estimates, retrofit costs were concentrated in the first two years of the analysis period. However, the FAA has extended the compliance period from the proposed 2-year period to three years in the final rule, which should provide relief to many operators.

Some commenters expressed concern about the high cost of retrofitting their aircraft. However, it appears they misunderstood that certain proposed flight recorder requirements would apply to newly manufactured aircraft only. Further, concerns were expressed that a 32 parameter retrofit requirement for 20 to 30 passenger seat aircraft operated under Part 135 would impose requirements that are more stringent than those requirements applicable to existing Part 121 aircraft. This issue has been resolved in the final rule by adopting requirements for existing 20 to 30 passenger Part 135 aircraft that are similar to the current Part 121 requirements.

One commenter stated that the FAA did not consider initial development and certification costs in its regulatory evaluation. However, the FAA did attempt to account for this by adding 10 percent to its equipment and installation cost estimates to provide for certification, start-up, and support equipment costs for proposals affecting aircraft operated under Parts 91, 125, and 135. This was not done for Part 121 because aircraft exist that meet the proposed requirements, and support equipment already is in service because of existing recorder requirements.

The regulatory evaluation of the final rule is very similar to the regulatory evaluation of the notice. Appropriate revisions have been made to reflect the extension of the compliance period from 2 years to 3 years, the easing of the flight recorder retrofit requirements originally proposed for larger Part 135 aircraft, and other minor clarifying changes.

Briefly, the costs of these rules result from the need to acquire, install, and maintain recorder equipment, as well as the cost of additional fuel consumption attributable to the additional weight of this equipment, and miscellaneous costs related to engineering and certification requirements, support equipment, and administrative start-up costs. The FAA estimates that the cost for all categories of aircraft affected by these rules will be approximately $297 ± million (1987 dollars), or a present value of $207 ± million when discounted back to the start of the ten-year analysis period using the 10 percent discount rate prescribed by the Office of Management and Budget. Other potential costs of this rule that have not been quantified include diminished payload carrying capability and/or reduced range that may affect some smaller aircraft as a result of the weight and volume of these recorders, as well as possible safety tradeoffs with other equipment, such as traffic alert and collision avoidance systems, ground proximity warning systems, weather radar, etc. Solid state technology potentially could avoid or reduce many of these costs and tradeoffs.

Flight recorders and cockpit voice recorders provide information only, which does not directly save lives or prevent accidents. Accidents and casualties are prevented by other actions, such as improvements in aircraft design or operating procedures, which may result from information gained by recorders. Because the benefits of recorders are indirect, they have only been discussed qualitatively in this analysis.

Flight recorders have proven effective in determinations of aircraft structural, mechanical, and systems failures that have led to corrective actions such as aircraft modifications or changes in operating procedures. Flight recorders are extremely useful in identifying the responses of flight crews to hazardous situations, and they contribute substantially to human factors analysis. Flight recorders also help define more precisely those operational problems that need to be addressed through research and development programs, such as windshear encounters. Further, many lessons learned from flight recorders, especially those concerning human factors and operational problems, are not limited to the particular aircraft type involved in an accident. Rather, they provide safety insights that are beneficial to all pilots operating many different types of aircraft under various operating rules. Additionally, recorders will aid significantly in the analysis of those accidents that will inevitably be experienced by aircraft utilizing new technologies, such as fly-by-wire control systems, canards, and extensive use of composite materials in aircraft structures.

INTERNATIONAL TRADE IMPACT ASSESSMENT

These amendments will have little or no impact on trade for either U.S. firms doing business in foreign countries or foreign firms doing business in the United States. The amendments will affect only U.S. air carriers and operators. Foreign air carriers are prohibited from operating between points within the United States; therefore, they would not gain any competitive advantage over the domestic operations of U.S. carriers. In international operations, foreign air carriers are not expected to realize any cost advantages over U.S. air carriers because many foreign countries have recorder requirements that are as stringent as those adopted in this final rule. Further, general aviation operations conducted in the United States are not in any direct competition with foreign enterprises. For these reasons, the FAA does not expect that these amendments will result in any trade impact.

REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires agencies to review rules that may have "a significant economic impact on a substantial number of small entities."

Any small entity that operates any aircraft in the categories that are included in the amendments to Parts 91, 121, 125, and 135 would be affected by this rule. Some of these amendments could result in "a significant economic impact on a substantial number" of small entity operators and air carriers. Most manufacturers that certificate aircraft under Parts 25 and 29 are not small entities and therefore are not subject to the RFA.

The following analysis explains the reasons for this determination concerning operators and air carriers. In developing estimates of annualized net compliance costs, uniform annualized costs for capital investments have been determined by multiplying the amount of the investment by a capital recovery factor appropriate for the discount rate and period of the analysis. A capital recovery factor of .155, based upon a 10 percent discount rate over a 10-year period, has been used in this analysis. Threshold cost values and small entity size standards are those stated in FAA Order 2100.14A, *Regulatory Flexibility Criteria and Guidance*. Values have been adjusted to 1987 dollars.

The threshold values defining a significant economic impact for scheduled carriers are $96,200 if the entire fleet has a seating capacity of over 60 seats, and $53,800 for other scheduled carriers. The threshold value for an unscheduled operator is only $3,800. Further, a small entity operator of aircraft for hire is defined as one which owns 9 or fewer aircraft.

The annualized cost for the least expensive requirement adopted in this final rule, a CVR retrofit, is approximately, $3,500 per aircraft. Therefore, an operator owning only one aircraft is very close to the $3,800 threshold for unscheduled operators, and any operator owning more than one aircraft is well over the threshold. This would apply to virtually all small Part 135 operators affected by the rule. A similar argument can be made for Part 125 operators owning only one aircraft because they would be required to retrofit the far more expensive flight recorders as well as CVR's. It is possible that a substantial number of small entities (defined as one-third of the small entities affected by the particular proposal) could incur significant economic impacts, particularly scheduled Part 135 operators (commuters) if they obtain between 6 and 9 new aircraft with 19 or fewer seats, or retrofit between about 4 and 9 aircraft with 20 to 30 seats. Further, any small unscheduled Part 121 operator purchasing one or more new aircraft not equipped with a digital data bus and digital flight data acquisition unit (DFDAU) will exceed the threshold for nonscheduled operators.

Part 91 operators of aircraft affected by these proposals generally are not small entities, however, and therefore would not be subject to the RFA. For these reasons, the FAA has determined that these amendments may have a significant economic impact on a substantial number of those small entities operating under Parts 121, 125, and 135, and a regulatory flexibility analysis is required under the terms of the RFA. The final regulatory flexibility analysis follows below.

FINAL REGULATORY FLEXIBILITY ANALYSIS

As required by Section 604 of the RFA, the following analysis deals with the proposed flight recorder requirements as they relate to small operators.

A. *Why Agency Action is Taken*

This rulemaking is in response to Congressional action and to several recommendations made by the NTSB. The reasons for agency action are detailed in the preamble and the regulatory evaluation.

Briefly, the advantages of additional recorded information have been demonstrated by those aircraft so equipped, and it is desirable that more specific information be obtained following an accident involving additional categories of aircraft than is possible under current regulations.

B. *Summary of Issues Raised by Public Comments*

Comments addressing those issues identified in the initial regulatory flexibility analysis as potentially affecting small entities primarily concerned the impact of the proposals on Part 135 operators. These commenters generally expressed concern that the proposals would impose unreasonable costs on operators in comparison to any safety benefits that might result. (Similar comments were received concerning Part 91 operations. However, those entities that conduct Part 91 operations in aircraft that will be affected by this rule generally are not small entities.)

In view of the data submitted, the final rule has been modified to extend the compliance period from 2 years to 3 years; and the flight recorder retrofit requirements for 20 to 30 passenger seat Part 135 aircraft have been reduced from the 32 parameters proposed, to only 11 or 17 parameters, depending upon the date of type certification (essentially, the same requirements as those currently in Part 121).

C. *Alternatives to the Proposal*

Other than those revisions discussed above, no alternatives to these proposals have been considered. The Secretary of Transportation has been directed by Congress to initiate a rulemaking that considers the recommendations of the National Transportation Safety Board to the Federal Aviation Administration concerning the use of cockpit voice recorders and flight data recorders on commuter and other aircraft. The FAA has concluded that Congress intended the NTSB to have available whatever data it needs for accident investigation purposes if acquiring that data is technologically feasible.

FEDERALISM IMPLICATIONS

The regulations set forth in this notice are proposed under the authority in the Federal Aviation Act of 1958, as amended (49 U.S.C. 1301 et seq.). The FA Act has been interpreted to preempt State law regulating the same subject. Thus, in accordance with Executive Order 12612, it is determined that this proposed regulation does not have federalism implications requiring the preparation of a Federalism Assessment.

CONCLUSION

The FAA has determined that this amendment is not major under Executive Order 12291 but that it is significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). For the reasons discussed above, it also has been determined that the rule may have a significant economic impact on a substantial number of small entities.

The Rule

Accordingly, the Federal Aviation Administration amends Parts 23, 25, 27, 29, 91, 121, 125, and 135 of the Federal Aviation Regulations, effective October 11, 1988.

The authority citation for Part 125 is revised to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 125-11

Traffic Alert and Collision Avoidance System

Adopted: January 5, 1989 **Effective: February 9, 1989**

(Published in 54 FR 940, January 10, 1989)

SUMMARY: These amendments require the installation and use of a Traffic Alert and Collision Avoidance System (TCAS) in large transport type airplanes and certain turbine powered smaller airplanes. The TCAS, which uses the Air Traffic Control Radar Beacon System transponder reply from other aircraft, will provide a collision avoidance capability that operates independently of the ground-based Air Traffic Control (ATC) system, and in areas where there is no ATC radar coverage. The Airport and Airway Safety and Capacity Expansion Act of 1987 directs the FAA to require the installation and operation of TCAS in commercial aircraft flying in the United States. The intended effect of this action is to minimize the possibility of midair collisions involving air carrier airplanes.

COMPLIANCE DATES (WHERE LATER THAN EFFECTIVE DATE):

1. Part 121. TCAS II requirement for operations conducted under Part 121 with more than 30 passenger seats: December 30, 1991.

2. Part 125. TCAS II requirement for operations conducted under Part 125 with more than 30 passenger seats: December 30, 1991.

3. Part 129. TCAS I requirement for operations conducted under Part 129 with 10 to 30 passenger seats: February 9, 1995. TCAS II requirement for operations conducted under Part 129 with more than 30 passenger seats: December 30, 1991.

4. Part 135. TCAS I requirement for operations conducted under Part 135 with 10 to 30 passenger seats: February 9, 1995.

FOR FURTHER INFORMATION CONTACT: Frank Rock, Aircraft Engineering Division, AIR-120, FAA, 800 Independence Avenue, SW., Washington, DC 20591; Telephone (202) 267-9567.

SUPPLEMENTARY INFORMATION:

Background

Regulatory History

On August 21, 1987, the Federal Aviation Administration (FAA) issued Notice of Proposed Rulemaking (NPRM) No. 87-8 (52 FR 32268; August 26, 1987). The NPRM proposed to amend Parts 91, 121, 125, 129, and 135 to require the installation and use of a family of Traffic Alert and Collision Avoidance Systems (TCAS) onboard certain airplanes, as follows:

14 CFR part	Applicability	Equipment	Compliance
91	All	TCAS	Voluntary
121	Large Airplanes	TCAS II/Mode S	3 years after effective date
125	Large Airplanes	TCAS II/Mode S	3 years after effective date
129	Turbine powered airplanes/10 to 19 passenger seats	TCAS I	5 years after effective date
	Turbine powered/20 to 30 seats	TCAS II/Mode S	4 years after effective date
	Turbine Powered/30 seats or more	TCAS II/Mode S	3 years after effective date
135	Turbine powered/10 to19 seats	TCAS I	5 years after effective date
	Turbine powered/20 seats or more	TCAS II/Mode S	4 years after effective date

All comments received in response to NPRM No. 87-8 were considered in adopting these amendments.

On December 30, 1987, the President of the United States signed the Airport and Airway Safety and Capacity Expansion Act of 1987, which, among other amendments, amended the Federal Aviation Act of 1958, Section 601, by adding a new section (f), titled "Collision Avoidance Systems." Title III, section 203 of that act states:

"(a) FINDINGS.—Congress finds that—

(1) the number of near midair collisions is an indication that additional measures must be taken to assure the highest level of air safety in the United States;

(2) public health and safety requirements necessitate the timely completion and installation of a collision avoidance system for use by commercial aircraft flying in the United States;

(3) the Traffic Alert and Collision Avoidance System promises to reduce the threat to life caused by midair collisions, particularly collisions between general aviation aircraft and commercial aircraft;

(4) the Traffic Alert and Collision Avoidance System will succeed only to the degree that other aircraft posing a collision threat use operating transponders with automatic altitude reporting capability; and

(5) the Federal Aviation Administration should continue at a deliberate pace the development of additional technologies, including the collision avoidance system known as TCAS III, to ensure the safe separation of aircraft."

"(b) GENERAL RULES.—Section 601 is amended by adding at the end the following new subsection:

(f) COLLISION AVOIDANCE SYSTEMS.—

(1) DEVELOPMENT AND CERTIFICATION.—

(A) STANDARDS.—

The Administrator shall complete development of the collision avoidance system known as TCAS II so that such system will be operable under visual and instrument flight rules and will be upgradeable to the performance standards applicable to the collision avoidance system known as TCAS III.

(B) SCHEDULE.—

The Administrator shall develop and implement a schedule for development and certification of the collision avoidance system known as TCAS II which will result in completion of such certification not later than 18 months after the date of the enactment of this subsection.

(2) INSTALLATION.—

The Administrator shall require by regulation that, not later than 30 months after the date of certification of the collision avoidance system known as TCAS II, such system be installed and operated on each civil aircraft which has a maximum passenger capacity of more than 30 seats and which is used to provide air transportation of passengers, including intrastate air transportation of passengers."

Airport and Airway Safety and Capacity Expansion Act of 1987, Pub. L. 100–223, section 203 (December 30, 1987).

The FAA has informed Congress that a schedule requiring a "complete" certification of TCAS II equipment within 18 months is extremely difficult because of the different equipment manufacturer designs to be approved; the number of different aircraft types and models; and the large number of commercial carriers requesting approval. Currently, the FAR require that operators apply for a separate supplemental type certificate for each equipment manufacturer's design and each type/model aircraft. Since the ultimate goal of Congress is clearly the actual installation of TCAS, the FAA is promulgating this rule to require the air carriers to install the system prior to the 48-month overall deadline. Therefore, after consideration of the legislation and the particular circumstances, the FAA concluded that these amendments requiring certification and installation of TCAS within 48 months from the date of enactment of P.L. 100–223 (December 30, 1987) constitute compliance with that amendment to the FA Act.

Public Law 100-223 also mandated an FAA regulation requiring the use of altitude-encoding transponders in certain airspace and terminal areas. An automatic altitude-encoding transponder,

designated as Mode C (or Mode S, since all Mode S transponders incorporate this feature), provide the air traffic controller with aircraft altitude in 100-foot increments. This information is displaye on the controller's radar screen with the data block for each tracked aircraft. The information i transmitted automatically in response to radar interrogations of the aircraft's radar transponder, an no communication with the pilot is required.

In response to Public Law 100-223 and previous FAA regulatory proposals, the agency adopte Amendment 91-203, *Transponder Automatic Altitude Reporting Capability Requirement*, in June 198 (53 FR 23356, June 21, 1988). The rule requires the use of a Mode C transponder for all operation within and above a terminal control area (TCA) or airport radar service area (ARSA); within 30 mile of a TCA or within 10 miles of certain other airports; and above 10,000 feet above mean sea level (MSL)

A TCAS II or III unit receives information from the Mode C transponder on a target aircraft The TCAS unit processes the information to provide the pilot of the TCAS airplane with altitud information on potentially conflicting aircraft and to provide vertical resolution advisories (RA's) (t climb or descend) to avoid the conflict. Mode C equipment installed on other aircraft is the only sourc of altitude information for a TCAS unit.

Discussion of Comments

Seventy commenters responded to Notice No. 87-8. Thirty-three respondents favor the propose rule to require TCAS; however, seventeen from this group expressed reservations about the phase-i period and ten stated that the final rulemaking should be postponed.

A breakout of the respondents showed the following number of commenters by interest category

Commercial aviation—6 foreign and 13 domestic carriers	19
Public comment—7 general public, 2 state representatives, and 1 consumer group	10
Government agencies—8 foreign and 2 domestic	10
Industry governing bodies	7
Industry/technical groups	9
Associations	8
Research organizations	2
Airframe manufacturers	4
Training/educational group	1
Total	**70**

Phase-In Period

Thirty-five commenters expressed concern regarding the phase-in period for TCAS. Of these, 12 requested an implementation time of 4 years minimum up to 7 years, with a 5-year period as the most popular timeframe mentioned.

Four commenters wanted a uniform time schedule for installation, instead of the uneven phase-in time proposed in the NPRM.

Only one person, a state government representative, mentioned shortening the phase-in period. That commenter wants TCAS installed as soon as possible.

Three commenters, including two manufacurers, expressed the opinion that the proposed deadline could be met.

Public Law 100-223 mandated the installation and operation of TCAS II on each civil aircraft that has a passenger capacity of more than 30 seats and that is used to provide air transportation of passengers including intrastate air transportation of passengers. The FAA cannot promulgate rulemaking contrary to the Public Law even in response to public comments to the proposed rule. Therefore, those comments proposing an extended phase-in time for aircraft with more than 30 passenger seats will not be addressed here.

The FAA agrees that those aircraft with 30 passenger seats or less and operated under FAR Parts 125 and 135 should not be required to have installed a TCAS II. Part 129 and Part 135 operators of turbine-powered aircraft with 10 to 30 passenger seats will be required to have a TCAS I system installed and operating.

While the technology required to build a TCAS I is fully developed, currently, there is no TCAS I design approved, and no manufacturer has built a TCAS I unit. There are three or four manufacturers considering the merits of developing a TCAS I design. One system is based on a passive design concept, another design is based on active interrogation, and a third concept is a combination of active/passive. These concepts have not been developed to a point where it can be judged whether any of the concepts will function as required. Considering the time required to develop, test, and obtain approval of TCAS I design and the time required to develop production facilities, coupled with user installation and training requirements, the need to allow additional calendar time became apparent. The additional time reflected in this final rule provides for the fabrication, certification, and operational evaluation of TCAS I unit prior to installation on passenger carrying airplanes.

In consideration of the absence of an approved TCAS I system at this time, the compliance dates for TCAS I installation and operation have been extended from 5 years to 6 years for those aircraft operating under Parts 129 and 135 with 10 to 30 passenger seats. Additionally, the FAA will provide test data and certain test assistance, and will participate with interested manufacturers and users to evaluate and test TCAS I units in accordance with Technical Standard Order (TSO)-C118, and participate in a field evaluation of TCAS I units with Part 135 carriers.

Two manufacturers announced publicly at the Airlines Electronic Engineering Committee (AEEC) International Conference on TCAS Implementation, December 1 and 2, 1987, that their production of TCAS II systems can be adjusted to accommodate any air carrier installation schedules.

Postpone Final Rulemaking

Most commenters stated that the final rulemaking should be postponed until the results of the Limited Installation Program (LIP) system tests could be analyzed. The LIP, which continues the operational evaluation of TCAS II, requires analysis and periodic reporting to the FAA. The primary objective of the LIP is to evaluate the TCAS II preproduction units in air carrier service using line pilots. United Airlines, the first airline to apply for supplemental type certificate for installation of a TCAS II system for the LIP, completed their 6-month evaluation and currently is in the process of completing the data analysis. During the United evaluation a total of 2,066 flight hours were logged on the two TCAS II equipped airplanes. The system generated a total of 933 traffic advisories (TA's) and 68 RA's. Northwest Airlines is scheduled to begin their LIP evaluation on or about September 1, 1988. Northwest will use two MD 80 airplanes for the evaluation.

The FAA believes that any fundamental problem existing would have shown up early in the LIP program. None has to date, nor has any major problem been identified in the Piedmont Phase I or II programs. (The 5-month evaluation of TCAS II on two Piedmont Airlines B–727 airplanes between November 1981 and May 1982 is referred to as Piedmont Phase I. The primary objectives of this evaluation were to assess the operation of TCAS in an air carrier operational environment and to develop an understanding of the potential effect of alerts on air carrier flight operations, flight crews, and ATC controllers and on the frequency of alerts and the circumstances under which they occur. The operational evaluation of TCAS II on a Piedmont Airlines B–727 airplane between March 1987 and January 1988 is referred to as Piedmont Phase II. The primary objectives of this operational flight evaluation were to assess the impacts of TCAS operation on flight crew workload; evaluate the impacts of TCAS on the ATC system and individual controllers; and obtain flight crew comments on the system's design parameters, displays, and operational procedures. The evaluation was also designed to provide additional data on the frequency of TCAS alerts and the circumstances under which TCAS alerts occur, evaluate the effectiveness of the flight crew training program, and identify and resolve equipment certification issues. See NPRM 87–8).

Most non-U.S. commenters expressed varying degrees of displeasure at the proposed unilateral action of the United States to mandate the installation and use in U.S. airspace of a collision avoidance system in *the absence of internationally agreed-upon technical specifications and operational procedures* for such an important system. These international standards, normally developed through the vehicle

of the International Civil Aviation Organization (ICAO) for equipment such as this prior to introduction into the international aviation system, are designed to insure equipment interoperability and avoid equipage redundancy. Hence, most foreign observers would like to see the U.S. equipage/use requirement delayed and, at the very least, its application to foreign operators under 14 CFR Part 129 delayed until such international standards are in place (currently expected to occur in late 1990) and a sufficient period of time is permitted for system acquisition and installation.

With regard to the present status of the effort to standardize the Airborne Collision Avoidance System (ACAS—the international equivalent of the U.S. TCAS), ICAO is relying on the services of technical and operational experts provided by 15 countries and 4 international organizations—organized into the Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel (SICASP)—to develop these important technical equipment specifications and operational procedures, which will result in the safe and efficient use of this system internationally. United States participation in this effort has been very active and has included the FAA, the National Aeronautics and Space Administration (NASA), U.S. industry groups, and FAA's two major TCAS contractors, MITRE and Lincoln Labs. At the behest of U.S. and other participants, a concerted effort is being made by this group to complete its work at a spring 1989 meeting, at which time proposed ACAS international standards will be presented to ICAO's Air Navigation Commission and Council for final review and approval. Assuming no unexpected difficulties materialize during this review process, the most critical changes to ICAO documents—the technical ACAS equipment specifications in ICAO Annex 10—should become applicable internationally in late 1990.

Four commenters mentioned postponing the rule until after the Radio Technical Commission for Aeronautics (RTCA) Minimum Operational Performance Standards (MOPS) changes 6 and 7 were complete and Aeronautical Radio Inc. (ARINC) specifications were in final form. The RTCA MOPS, change 6, was not completed in time for publication in TSO C-119, TCAS II; therefore, the TSO references FAA Report No. DOT/FAA/SA-88/3, *Required Modifications to the Traffic Alert and Collision Avoidance System (TCAS II) Minimum Operational Performance Standards (MOPS)*. When change 6 is approved by the RTCA Council, the TSO will be revised to reference RTCA DO-185 changes 1 through 6. Change 7 is not required for FAA approval.

One manufacturer recommended delaying the rule and holding the docket open until the LIP is finished and all reports are made available and the MITRE report 87W00157 is released and reviewed. The United Airlines LIP report has been completed and made available in the docket. The Mitre report 87W00157 was revised and adopted in the TSO.

Public Law 100—223, Section 203, does not permit compliance dates for TCAS II later than those adopted in this rule, and the FAA could not consider comments requesting later dates.

Technical Discussion

Thirty-three commenters included a discussion of TCAS, ACAS, Mode S, Mode C, or ATC technologies in their comments. Many in this group expressed the opinion that the technology still needed to be "fine tuned" before implementation. The FAA has provided for fine tuning of TCAS through the RTCA SC-147 committee working groups. The RTCA MOPS change 6 will contain additional fine tuning features, including simplification of the TCAS-to-TCAS coordination process, elimination of the advisory invalid indication, and many other recommendations.

One commeter postulated that the requirements for all aircraft to have "active TCAS systems would overload and violate the FAA's own requirement of limiting radio use for TCAS purposes to 1 percent of the total usage of the frequency that TCAS would operate on." This issue is not new. It was identified as one of the main development questions when, in 1982–84, the Beacon Collision Avoidance System (BCAS) design was extended to TCAS by increasing the ability to operate effectively under high density conditions. In the Lincoln Laboratory report that documents this development effort, "TCAS II: Design and Validation of the High-Traffic-Density Surveillance Subsystem," this issue is clearly identified (ATC-126, Feb-85, pages 2-6 to 2-9).

The TCAS II includes a provision called "Interference Limiting," the purpose of which is to insure that TCAS transmissions will not cause any degradation of any other systems operating in the 1030/1090 MHz frequency bands. During the TCAS development, it was recognized that a number of possible

interference mechanisms needed to be considered: (1) reception of TCAS interrogations by transponders, (2) reception of TCAS replies by ground-based ATCRBS equipment, and (3) self-suppression of the transponders on the TCAS aircraft. It was decided to place limits on TCAS transmissions in such a way as to give TCAS a low priority in these frequency bands. In doing this, a rather severe limit of 2 percent was adopted as the maximum interference that can be contributed by all of the TCAS transmissions in a given area. The Interference Limiting standards were initially determined analytically from basic principles of physics. It was found that a relatively simple model could be implemented to provide the ability to adapt to any given density of aircraft and any percentage that are TCAS equipped. Subsequently, the interference limiting design was assessed by a large interference simulation of the 1030/1090 MHz bands. This simulation study was conducted by the Electromagnetic Compatibility Analysis Center (ECAC), making use of their experience in assessing many other similar interference issues. The simulation included a large number of aircraft, each with a given flight path, acting together with a large number of ground-based interrogators, with power levels, beamwidths, and other characteristics relating to operating conditions predicted for the 1995 timeframe. Two main conclusions resulted from this study. One was that the 2 percent interference allocation for TCAS was not exceeded. The other was that radio transmissions attributable to TCAS were completely insignificant in their effects on the performance of the ground-based ATCRBS equipment. As a result of this analysis and testing, the FAA concluded that there will not be a frequency interference problem.

One manufacturer submitted the following comments not previously addressed.

Comment:

Equipment designs tested to date have not represented production TCAS II equipment. Representative equipment must be tested so that its acceptability in service can be assessed. Logic included in equipment tested, or to be tested (LIP), does not include corrective logic for "Altitude Crossover" or "TCAS-Invalid" deficiencies.

FAA response:

The FAA will conduct flight tests of production units to validate the corrective logic.

Comment:

Display requirements for "Glass Cockpits" will not be defined before mid-1988.

FAA response:

The FAA defined and issued display requirements for "Glass Cockpits" in an advisory circular (AC) entitled *Airworthiness and Operational Approval of Traffic Alert and Collision Avoidance Systems (TCAS II) and Mode S Transponders*, AC No. 20-131, October 3, 1988.

Comment:

Certification requirements, analysis, simulation, and flight test are not adequately defined, nor is a flight criticality level for TCAS II certification specified.

FAA response:

As previously mentioned, AC No. 20-131 was published on October 3, 1988. It proposes acceptable certification criteria. The TCAS II system must be certified to the essential level, and the software programs to level 2 of RTCA DO-178A.

Comment:

Certification requirements for compliance with foreign regulatory agency requirements for TCAS deactivation are unknown.

FAA Response:

There is a possibility that a foreign government may request a U.S. TCAS-equipped airplane to deactivate the TCAS system, which is provided for in the TCAS equipment standards. Section 91.1 of the FAR's provides for compliance with the foreign government regulatory requirements.

Comment:

Certification requirements for U.S. carriers with airplanes dedicated to service abroad, such as Pan Am, are unknown.

FAA response:

Public Law 100–223 requires installation "on each civil aircraft which has a maximum passenger capacity of more than 30 seats and which is used to provide air transportation of passengers . . ." An air carrier operator who experiences hardship due to this regulation may petition for an exemption under section 601 of the FA Act of 1958.

Comment:

The means of providing integrated TA's and RA's on older airplanes without color weather radar displays has not been economically addressed.

FAA response:

The FAA minimum requirements specified in the TSO will require only a minimum of a three-target display. Any display beyond this minimum will be evaluated at the time of certification.

Comment:

Required crew response to TA's and RA's should be specified. For TCAS to be effective, a standard mandatory response is necessary.

FAA response:

The FAA does not believe that a mandatory response to TA's or RA's is necessary or appropriate. The AC for TCAS II certification and operation [AC No. 20-131; October 3, 1988] addresses crew training objectives.

Mode C

Five commenters addressed the issue of using Mode C. Generally, the respondents expressed the opinion that Part 125 aircraft should be allowed to use Mode C as an alternative to the TCAS II system, as the TCAS equipment costs would be prohibitive for such a class of operator. As previously mentioned, if the Part 125 operator's aircraft is configured for 30 passenger seats or less, then that aircraft is exempt from the TCAS requirement.

ICAO/Part 129 Foreign Carriers

The majority of comments mentioning ICAO (15) suggest that the FAA should coordinate TCAS implementation with Standards and Recommended Practices (SARPS) for international standardization. A standard for an ACAS generated by ICAO is especially important to foreign carriers. The FAA is actively participating with various ICAO technical groups through SICASP in an effort to generate this standard. The SICASP group will have been provided all FAA data concerning TCAS.

Of the comments addressing only the issue of TCAS implementation in Part 129 aircraft, two are against, two are for, and three request additional time to comply. Public Law 100-223 did not exempt foreign air carrier operations, within U.S. airspace, from TCAS II requirements. The Congressional finding states that public health and safety requirements necessitate the timely completion and installation of a collision avoidance system for use by commercial aircraft flying in the United States. However, the FAA is extending the compliance time from 5 to 6 years for airplanes with 10 to 30 seats. These operators may elect to install TCAS I, II, or III. If they install a TCAS II or III unit, it must be compatible with TSO C-119.

Foreign air carrier aircraft with more than 30 passenger seats will be required to have installed and operating a TCAS II system, compatible with TSO C-119, when operating in the United States after December 30, 1991.

Upgrade TCAS II to TCAS III

In responding to the issue of upgrading TCAS II to TCAS III, most comments addressed the need for clarification. The respondents stated that the implied requirement for upgrading was questionable and should be more definitive. The upgrading has the support of one manufacturer, and another is supportive of the idea to require that TCAS III include the same operational criteria that will be used for TCAS II. One manufacturer stated that the "incentive to provide TCAS III growth is too vague to justify economic commitments."

Although the FAA has not required or proposed a compliance date for TCAS III, it will continue to develop, test, and evaluate TCAS III and provide data and technical support to RTCA for development of a TCAS III MOPS. Although the FAA may support a particular design for testing, it is more important that it fosters the development of the MOPS. The FAA continues to support a LIP for TCAS III.

Other than the air-to-air coordination logic, the manufacturer has freedom of design of the TCAS systems. The FAA agrees with the commenter who expressed concerns regarding the interoperability of TCAS II and III. The TCAS II design shall not preclude the upgradeability to, nor the interoperability of, TCAS II and III. This rule does not mandate a TCAS III system. New rulemaking would have to be initiated for the requirement of TCAS III.

Training

Eight commenters were evenly divided concerning the need for standardized training prior to TCAS II implementation. Those who favor training requirements want training to focus on end-level performance, and do not believe that a specific technique is important. Training should focus also on difficulties involving the upgrade from TCAS II to TCAS III. The FAA intended the training requirements proposed in the NPRM to be training objectives, and the training program may not necessarily be limited to the proposed items. The training items, as proposed, appear in AC No. 20-131 dated October 3, 1988. The AC prescribes a means, but not the only means, of complying with the regulatory requirements.

Advisory Circular

Five commenters addressed the need to publish AC's regarding the TCAS system. Domestic industries that responded to this issue requested that such a circular be published 24 months in advance of the rule adoption. The FAA published AC No. 20-131 on October 3, 1988, to provide guidance for the installation and operational approval of TCAS III.

Product Liability

Several commenters, some foreign, addressed the issue of product liability. The commenters suggested that, as a result of the FAA's requirement to install a system designed and developed by the FAA, the Government will be subject to product liability claims for use of TCAS equipment. Some commenters further requested that the FAA voluntarily indemnify the regulated operators from such liability.

The FAA considers the TCAS requirement similar to other operating requirements involving the use of certain equipment, and the agency does not consider it necessary or beneficial to make any special provision for liability claims against the Government or regulated operators.

Applicability

Thirty-six commenters addressed this issue. Four of the comments were sent by private individuals, nine were sent by foreign agencies, and the remainder were submitted by domestic (U.S.) industries. The primary concern expressed was that TCAS I should be required for Part 135 operators, but not TCAS II. Many commenters expressed the opinion that there is no justification for the use of the TCAS system over other collision avoidance systems. As previously stated, the FAA relaxed the TCAS requirement and compliance times proposed in the NPRM for Part 135 operators. Additionally, the FAA will evaluate passive/active TCAS I systems.

Foreign operators stated that it was necessary to continue to allow ATCRBS to be used, due to the cost of installing and operating Mode S, and that the installation of the TCAS system should be limited to new U.S.-registered aircraft. Many comments addressed the need for uniform installation of the TCAS system, and a few respondents expressed the opinion that Mode C should be mandatory in all aircraft.

The FAA addressed the Mode C requirement in another rulemaking action, "Transponder with Automatic Altitude Reporting Capability Requirement," Amendment No. 91-203 (53 FR 23356, June 21, 1988). Mode S is a necessary component of TCAS II. The Mode S air-to-air data link provides TCAS II with the coordination procedures necessary for the proper RA in a TCAS to TCAS conflict. The TCAS I does not require a Mode S transponder to be installed.

The introduction of TCAS I and II is expected to reduce substantially the threat of midair collision. To equip only new U.S.-registered aircraft would be inconsistent with the requirements of Pub. L. 100-223 and would delay the benefits of a TCAS program. A high degree of protection can be realized for those operators with the expanded requirement for Mode C in general aviation aircraft and TCAS II in air carrier aircraft. Concerns were raised about the size, weight, and interfacing of the new equipment, and some comments cited the need to test representative equipment to assess its service acceptability. Some commenters stated that the display of aircraft was an essential component in the Minimum Equipment List (MEL). The FAA promulgates minimum standards and evaluates manufacturers' designs to those standards. Size, weight, and interface are market place decisions. Service acceptability will be assessed in that the system is compatible with other TCAS designs with respect to coordination logic and human factor considerations. The FAA evaluates the display systems for minimum requirements and functional compatibility during the certification evaluation in the aircraft.

Nine commenters expressed concerns relative to Part 125 aircraft. Four of these respondents stated that Part 125 aircraft should be exempt from the rule or be allowed to maintain the existing ATCRBS system requirements. The Congressional mandate covers all commercial aircraft with passenger seating configuration of more than 30 seats. With respect to aircraft with 30 seats or less, the FAA agrees with the comments. Under the rule adopted, those aircraft operating under the provisions of Part 125 in nonrevenue passenger service, with passenger seat configuration of 30 seats or less, will not to be required to have a TCAS system installed.

Include All Aviation

Fifteen commenters stated that the only way to ensure maximum effectiveness of the proposed TCAS system is to extend the requirement to include Part 125, Part 129, Part 135, and military aviation aircraft. The final rule does include aircraft operating under these parts to varying degrees, but it does not apply to military aircraft. However, the U.S. Navy is studying the feasibility of using TCAS I on military trainers, and the FAA is cooperating with the Navy to pursue certification of a passive/active system for the Navy T-34C trainer aircraft.

One commuter questioned whether the rule is to apply to air cargo carriers. The Part 121 rule specifically addresses aircraft with passenger configuration of more than 30 seats. However, if there is a split cargo/passenger aircraft with more than 30 seats, the airplane must have a TCAS II installed; 10 to 30 seats, the airplane must have at least a TCAS I installed. However, the FAA will not require installation of a TCAS on a large combination cargo/passenger airplane simply because of the capability for increasing passenger capacity, if the aircraft is not operated with 10 or more passenger seats.

One commenter suggested issuing a supplemental NPRM that airworthiness regulations be amended to require TCAS and to adjust the requirement of Section 25.1309 to recognize the value of TCAS in reducing overall risk. The FAA does not believe this is necessary in that all Part 25 aircraft are not required to have TCAS II installed according to the operating rules.

FAA Responsibility

Several comments received expressed a desire that configuration of the Collision Avoidance System (CAS) software be the responsibility of the FAA. The FAA does control the configuration of the CAS logic software by requirements in the TSO and subsequent installation approval. To change the software of the CAS logic would require the TSO holder to apply to the FAA for approval of a major change to the original approved design data. Deviations (major changes) to TSO's are only approved by the Aircraft Engineering Division of the Office of Airworthiness in Washington, D.C.

Pilot Immunity for TCAS

There are several commenters who desire the FAA to grant blanket immunity to pilots for following or failing to follow an RA from the TCAS. The FAA cannot support this proposal from the industry for the following reasons:

(a) The pilot will always be ultimately responsible for his/her actions and must be held accountable for them. In the case of TCAS, there is no doubt that there may be instances where the pilot will

be "off-altitude" in response to a TCAS-generated RA, and may indeed be involved in a near midair collision or an actual collision. During the review process of the incident, as in all incidents, all factors will be considered, including the factors that are TCAS related, and a determination made. This is the only position that the FAA can take on this matter and it must be made clear to all operators of TCAS.

(b) The FAA has never granted blanket immunity to flightcrews for any operation regardless of the criticality of that operation. There is no legal precedent for granting such broad relief from responsibility. Section 91.3 of the FAR states, "The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." Introducing TCAS into the National Airspace System does nothing to change this regulation.

Every consideration will be given to the flightcrew in the review process for TCAS-related incidents. All factors will be thoroughly reviewed and determination made as to responsibility.

Aviation Trust Fund

One commenter expressed the opinion that the FAA would be well advised to use the Aviation Trust Fund to upgrade and improve the existing ATC system. This comment is outside the scope of this NPRM.

Economic Considerations

Of the 32 comments received mentioning economic considerations, only two respondents, both elected government representatives, were of the opinion that the cost involved is minimal. Most commented that the economic impact is not adequately addressed. Specific concerns voiced include those from small operators who believe they will be forced out of business, and large airlines who believe that the upgrade from TCAS II to TCAS III will be costly. As previously mentioned, the FAA relaxed the time for compliance for airplanes having a seating capacity of 10 to 30 passenger seats. This change will definitely reduce the economic impact on small operators. Four commenters proposed less costly alternate systems to TCAS.

In the NPRM the FAA agreed to consider passive versus active TCAS I systems as long as the applicant can demonstrate that the passive system provides the equivalent level of safety as active TCAS I. To date, the FAA has received no valid data to show that a passive TCAS I can meet the safety intent of the rule, so this final action assumes an active TCAS I. If passive TCAS I can be demonstrated to meet the rule, then the FAA would be amenable to follow-on regulatory action to allow its use.

The FAA does not expect to mandate TCAS III at this time. The economic considerations for TCAS II are discussed in the regulatory impact analysis summary.

Other Comments Not Previously Addressed

One manufacturer suggested new standards for automatic altitude reporting be required similar to an ATA petition dated March 25, 1986. Although the FAA would have to agree that reduced altitude error does increase the accuracy of the projected flight path of the intruder aircraft during TCAS tracking, the safety analysis done on the current altitude encoder errors would conclude safe TCAS operation.

One commenter was concerned that there was no data on the performance characteristics of TCAS II in high wing with engines mounted on the wing. The FAA does not have any information or data that indicates there will be any adverse effect of TCAS operation on these aircraft. However, the FAA will conduct in-service evaluations in such aircraft to obtain system performance and aircraft performance information.

One commenter, James Pope, was critical of the FAA's TCAS program and supported an ACAS unit not dependent on radar transponders. Pope alleged that 770 lives have been lost in ACAS-preventable midair collisions during the development of TCAS. This commenter asserts that NPRM 87-8 must be promptly withdrawn and immediate action taken by FAA to certify the proven and ready-to-go ACAS.

This commenter has previously made these same allegations to the FAA which were subsequently investigated on two occasions by the General Accounting Office and found to be without basis. The

FAA believes that it has previously provided detailed answers to the commenter's allegations, and does not believe it is necessary to give an indepth analysis here. Anyone wishing a copy of the investigative reports can contact the person identified under the section, "For Further Information Contact."

Discussion of Rule

The FAA currently operates a complex network of facilities and subsystems designed to ensure the safe and efficient operation of the National Airspace System (NAS). Operations within the NAS and its many components are governed by an array of Federal Aviation Regulations (FAR) and procedures. Consequently, a wide variety of facilities and services are available. Nevertheless, the primary function of separating aircraft is predicated on the fundamental concepts of ground-based control and the see-and-avoid responsibility of the flightcrew.

Under the see-and-avoid concept, the level of safety is related to the ability of pilots, individually and collectively, to detect and avoid encounters with other aircraft. Although common sense and the FAR require continuous adherence to the principles of see-and-avoid, the concept does have limitations. The pilot's ability to acquire aircraft visually on collision courses is reduced under heavy workload conditions, in areas of high traffic densities, and when the aircraft is in conditions of poor visibility.

The second fundamental concept upon which the separation of aircraft is predicated is ground-based control. Through the issuance of instructions, clearances, and advisories, air traffic controllers ensure that prescribed separation standards are applied between aircraft. Since these instructions are based on known and projected flight information, this system does not rely totally on the pilot's ability to acquire traffic visually to achieve acceptable levels of safety. In some segments of the NAS, such as terminal control areas, positive control is exercised, and operations in such airspace are conducted under ATC instructions. A terminal radar service area is an example of upgrading of the see-and-avoid concept and represents a complex control environment, since both controlled and uncontrolled aircraft are operating in the area. The overall collision avoidance system design must address the unique problems of such a mixed traffic environment.

The FAA's approach to TCAS is to encourage the development of a family of onboard collision avoidance systems, to demonstrate the operational and technical feasibility of the concept, and to support the development of national/international standards for the equipment. A principal objective of the TCAS approach is to provide a range of collision avoidance equipment alternatives for the full spectrum of airspace users ranging from small airplanes to large transport category airplane. The TCAS Program consists of the following three program elements: TCAS I, which provides only TA's; TCAS II, which provides TA's and RA's in the vertical plane only; and TCAS III, which provides TA's and RA's in both the vertical and the horizontal planes.

On December 30, 1987, the President of the United States signed Pub. L. 100-223 which, among other provisions, amended the FA Act of 1958, Section 601, by adding a new paragraph (f) entitled "Collision Avoidance Systems." This new section requires TCAS II on "each civil aircraft which has a maximum passenger capacity of more than 30 seats and which is used to provide air transportation of passengers, including intrastate air transportation of passengers." The amendment does not provide for the exception of any class of civil operation or operator, U.S. or foreign, from the basic rule.

The rule adopted provides for the installation of appropriate TCAS units on airplanes used in commercial air carrier, selected air taxi/commuter operations, and on airplanes used by foreign carriers flying in the U.S. airspace. The categories of commercial aircraft for which TCAS I or II will be required are based on the provisions of P.L. 100-223 and on the relative speed of the aircraft, the size of the aircraft, and the number of passengers per aircraft who would benefit from TCAS installation.

Aircraft operating exclusively under Part 91, General Operating and Flight Rules, are not required to have installed any TCAS equipment. However, if an operator or owner elects to install a TCAS unit, the system must be FAA approved and operated according to FAA prescribed procedures. The TCAS system installed must be shown to operate in the ATC system and in coordination with other FAA approved active TCAS systems.

Part 135 commuter and air taxi operators of turbine powered airplanes with 10 to 30 passenger seats will be required to install a TCAS I system to provide TA's from other transponder-equipped aircraft. These advisories should give bearing and distance from the TCAS-equipped airplane in

the case where the other aircraft have only a Mode A transponder (no altitude reporting). If the intruder aircraft is Mode C- or Mode S-equipped, the TCAS I unit should also display altitude, which provides the pilot a sector both in the vertical as well as the horizontal plane to look for the threat aircraft. TCAS I, although not providing an RA, does provide sufficient alerting time for the pilot to visually acquire the threat aircraft and take evasive action if necessary. Although the RTCA MOPS has been approved for TCAS I, no system has been built to date. The FAA believes that development of collision avoidance equipment that can meet the TCAS I MOPS is well within the state of the art for equipment manufacturers and that adequate quantities to supply the commuter/air taxi fleet can be manufactured and installed during the time period prescribed.

Part 135 operators of 10 to 30 passenger seat turbine powered airplanes are required to have installed a TCAS I within 6 years after the effective date of the rule. Installation of TCAS I does not require the installation of a Mode S transponder.

Part 121 and 125 operators of large airplanes of more than 30 seats are required to have TCAS II and Mode S installed and operating by December 30, 1991. These operators may wish to upgrade to TCAS III units when they become available. Much research is necessary to develop TCAS III to the point that it can be type certificated. The ability to produce operatonal TCAS III units is many years away.

Part 129 foreign air carrier operators of turbine powered airplanes with passenger seating configurations of 10 to 30 are required to have installed and operating a TCAS I when operating in U.S. airspace 6 years after the effective date of this rule. Foreign air carrier operators of airplanes with more than 30 passenger seats are required to have installed and operating a TCAS II and Mode S transponder when operating in U.S. airspace after December 30, 1991. The FAA believes that this final rule will encourage affected foreign airplane operators, and their airworthiness authorities, to become familiar with the associated TSO's and RTCA documents that form the basis of approval and manufacture of a TCAS approved by the FAA. The TCAS systems approved by foreign airworthiness authorities must be compatible with and perform with the FAA-approved TCAS, transponders, and ATC system when operating in United States airspace.

Where the rules require a TCAS I or II unit, the intended minimum TCAS units are those complying with the requirements of TSO C-118 and TSO C-119 as appropriate, with the exception of Part 129 foreign air carrier operators. Where the rule specifies an approved TCAS, the installer may elect TCAS I, II, or III. Where the rule requires a TCAS II, the installer may elect TCAS II or III. There is no requirement, at this time, for the installation of a TCAS III system. The TCAS III system is being developed to enhance the basic TCAS II system by providing a more accurate surveillance capability and alternative escape maneuver selection in the horizontal plane. The FAA can envision that some operators may want to update their TCAS II units to TCAS III when available. The required TCAS III system design as will be defined in the applicable TSO and MOPS will permit the upgrading of a TCAS II unit to a TCAS III. In the applicable standards for TCAS II, whenever a choice exists between TCAS II and TCAS III elements (i.e., antenna, etc.), the TCAS III element will be specified in the TSO and MOPS. The FAA is committed to support the development of TCAS III. Any rulemaking concerning mandatory use of TCAS III will be handled separately from this rulemaking.

Flight Manual Requirements and Operational Approval

Where the rule requires TCAS to be used in air carrier service, operational approval must be obtained from the FAA at the time that certification (TC or STC) application is made. The applicant must submit for approval flight crew qualification, training program, and TCAS inoperative items to be included in the appropriate Master Minimum Equipment List.

Technical Standard Order

The RTCA Special Committee SC-147 has developed RTCA Document DO-197, Minimum Operational Performance Standards (MOPS) for An Active Traffic Alert and Collision Avoidance System I (Active TCAS I). This document forms the basis of a TSO that will permit the active TCAS I to be manufactured under the TSO approval system.

The RTCA Document DO-185, Volume I and II, Changes 1 thru 5, *Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment* and FAA Report No. DOT/FAA/SA-88/3, *Required Modifications to the Traffic Alert and Collision Avoidance System (TCAS II) Minimum Operatinonal Performance Standards (MOPS)* set forth standards for TCAS II equipment. These documents will also form the basis of a TSO to permit manufacturing under the TSO approval system. The TCAS III MOPS will be a new RTCA document separate from DO-185 but will identify a system functionally compatible and interchangeable with TCAS II. The three TCAS systems I, II, and III will be identified under the TSO system by different TSO numbers. Concurrent with the publication of this rule, the FAA is publishing TCAS I and TCAS II TSO's defining the minimum standards for such units.

While FAA research, to date, has focused on an active TCAS I, it has been suggested by some people that a passive (listen only) device may be able to meet the same objective intended by the active TCAS I units. While this regulatory action on a TCAS I TSO presupposes an active TCAS I, the FAA wishes to go on record as not being opposed to a passive TCAS I, as long as it meets the same safety objectives of DO-197.

TCAS Training Requirements

The introduction of TCAS into revenue service need have little impact on the existing regulations regarding required crew training, and therefore should not require a change to the existing training requirements. As specified in § 121.401, a Part 121 certificate holder is required to establish, obtain the appropriate initial and final approval of, and provide a training program that meets the requirements of Part 121, Subpart N, and insure that each crewmember is adequately trained to perform his/her assigned duties. Section 121.401 will have the effect of requiring training on TCAS. Section 121.415(g) requires that each crewmember qualify in any new equipment, including modifications to airplanes. Section 121.407(a)(3) requires that each airplane simulator and other training device be modified to conform with any modification to the airplane being simulated.

The pilot training program for TCAS should provide the flightcrew the necessary knowledge, skills, and abilities to safely conduct TCAS operations.

Regulatory Impact Analysis Summary

Introduction

This section summarizes the cost impact and benefit assessment of the final rule to amend Parts 1, 91, 121, 125, 129, and 135 of the Federal Aviation Regulations (FAR) to require the installation and use of a Traffic Alert and Collision Avoidance Systems (TCAS) in large transport airplanes and certain turbine-powered smaller airplanes. TCAS II, which utilizes a signal from existing transponders equipped with altitude encoding capability, provides collision avoidance guidance in the airplane independent of the ground Air Traffic Control (ATC) system. These amendments also require that all operators of TCAS-equipped airplanes have an FAA-approved training program for flight crewmembers. Finally, this rule requires that certain small aircraft be equipped with TCAS I, a simpler system providing collision alert warning but no flight guidance. The amendments are in response to legislation that mandates the FAA to require the installation and operation of TCAS in certain commercial airplanes flying in the United States.

These amendments stem from a Notice of Proposed Rulemaking (NPRM) published in the Federal Register on August 26, 1987. Comments on the proposal were submitted by individuals, foreign and domestic air carriers, air carrier and airline pilot associations, foreign and domestic Government agencies, research and consultant organizations, avionics manufacturers, and the National Transportation Safety Board. Approximately half of the 70 respondents expressed support of the proposed rule to require TCAS. The remaining respondents, however, opposed certain proposed requirements and disagreed with the economic impact estimates presented in the preliminary regulatory analysis. The FAA has evaluated the public comments and made a final determination regarding their impact. The comments have caused the FAA to revise its estimates of economic impacts and

increase compliance costs. The final rule amendments to Parts 121, 125, and 129 require that after December 30, 1991, no person may operate a large airplane that has a passenger seating configuration, excluding any pilot seat, of more than 30 seats unless it is equipped with an approved TCAS II and the appropriate class of Mode S transponder.

A substantial change in the final rule is the elimination of the requirement contained in the notice that airplanes operated under 14 CFR Parts 125, 129, and 135 having a passenger seating configuration of 20 to 30 seats be equipped with TCAS II. The final rule, therefore, requires that turbine-powered airplanes operated under Parts 129 and 135 having a passenger seating configuration of 10 to 30 seats, excluding pilot seats, be equipped with TCAS I under a longer than normal compliance period.

Cost-Benefit Analysis

Executive Order 12291 of February 17, 1981, requires that to the extent permitted by law, regulatory action not be taken unless the potential benefits to society for the regulation outweigh potential societal costs. This determination is normally made on the basis of a regulatory evaluation. In this case, however, the Congress may be said to have already determined that this final rule is in the public interest; that is, its collective public benefits outweigh its costs to the public, because Congress has required the rule be promulgated (The Airport and Airway Safety and Capacity Expansion Act of 1987: Public Law 100-223). Nevertheless, the FAA has prepared this conventional regulatory evaluation of the rule. The purpose of this evaluation is not to justify taking this rulemaking action (which has already been done through congressional action), but to estimate dollar costs and benifits to promote understanding of the impact of the rule.

Costs

The FAA finds that the revisions to Parts 1 and 91 will have no cost impact. The amendments, however, to Parts 121, 125, 129, and 135 will cause affected certificate holders to incur costs.

The FAA recognizes that there will be costs associated with the amendments to Part 129. These costs are likely to be similar to those incurred by affected Parts 121 and 135 certificate holders, but have not been quantified because the burden of compliance will not be directly borne by any sector of U.S. society.

The methods and assumptions used in this analysis to prepare the final cost and benefit estimates for the revisions to Parts 121, 125, and 135 have been developed by the FAA. Data used to develop cost estimates at the NPRM stage of rulemaking were obtained from manufacturers, air carriers, avionics repair facilities, and industry trade associations. The FAA has updated this information and conducted additional research to respond to the comments concerning the economic impact estimates of various proposals. The information obtained has been used to formulate the final cost estimates of the rule. The cost and benefits calculated for the final rule are projected over the estimated 15-year life cycle of TCAS equipment. Therefore, this analysis compares the costs and benefits of TCAS II equipment for Parts 121 and 125 over a 15-year period of 1989 to 2003. To allow sufficient time for the development and certification, this rule does not require the use of TCAS I until 1996. Accordingly, to reflect the longer than normal compliance period, the analysis for Part 135 has been extended over the 15-year period of 1993 to 2007.

New § 121.356 will have an economic impact on the 3,365 existing airplanes expected to be in service in 1989 and 3,100 airplanes expected to be manufactured between 1989 and 2003 because these airplanes will be required to be equipped with a TCAS II system. The estimated cost of this requirement is $806.3 million in 1987 dollars and $543.0 million at a present worth discount rate of 10 percent over the 15-year period of 1989 to 2003.

The amendments to Part 121 will also require that air carriers develop and implement an FAA-approved TCAS II training program for their captains and first officers. The training program will require that air carriers install approved TCAS II aerodynamic data programs in their flight simulators and provide an additional one and a half hours of classroom instruction during initial training for their existing and newly-hired flightcrews. As part of the classroom instruction, certificate holders will be required to use a real time interactive device to complete transfer of system knowledge from

the classroom to the cockpit. The estimated cost of modifying the 150 flight simulators currently in use by Part 121 certificate holders is $2.2 million in 1987 dollars and $2.0 million discounted at a present worth rate of 10 percent in the first year the rule is in effect. The cost of acquiring the small computers to be used as interactive training devices to transfer and reinforce classroom instruction is estimated to be $462 thousand in 1987 and $420 thousand discounted the first year the rule is in effect.

The estimated cost of requiring captains and first officers of the 149 affected Part 121 certificate holders to undergo additional classroom training is $24.5 million and $13.7 million discounted over the projected time period. Finally, the onetime cost of developing an FAA-approved TCAS II training program is estimated to be $3.7 million in 1987 dollars and $3.4 million discounted at a rate of 10 percent in the first year the rule is in effect. This analysis indicates that the total cost of compliance to Part 121 certificate holders with the equipment acquisition installation, maintenance, and flight crewmember training requirements contained in this rule is estimated to have a present value of $562.5 million over the 15-year period of 1989 to 2003.

The addition of § 125.224 will require that airplanes with a passenger seating configuration, excluding any pilot seats, of more than 30 seats be equipped with TCAS II. The estimated cost of equipping the 22 airplanes now operating under the rule of Part 125 is $2.5 million in 1987 dollars and $2.3 over the 15-year period of 1989 to 2003.

The amendments to Part 135 will require that all turbine powered airplanes with 10 to 30 passenger seats be equipped with TCAS I. In addition, the rule will require that all operators of TCAS I equipped airplanes have an FAA-approved TCAS I training program for flight crewmembers.

The estimated cost of equipping 2,772 airplanes with TCAS I units is $34.1 million in 1987 dollars and $14.7 million discounted over the 15-year projected service life of the equipment of 1994 to 2008. The estimated cost of requiring the flightcrews of affected air taxi and commuter operators to undergo additional classroom training during the initial phase of flight training is $1.3 million in 1987 dollars and $0.7 million at a 10 percent present worth rate. Finally, affected Part 135 operators required to have an FAA-approved training program will incur a one-time cost estimated to be $1.0 million in 1987 dollars and $.9 million discounted at 10 percent the first year the rules is in effect. On the basis of the above, the aggregate impact of these amendments on affected air taxi and commuters is $36.5 million in 1987 dollars and $16 million when discounted at 10 percent over the 15-year period of 1993 to 2007.

Benefits

The TCAS rule is expected to provide potential benefits primarily in the form of improved safety to the aviation community and flying public. Such safety, for example, will take the form of reduced casualty losses (namely, fatalities and property damages) as the result of a lowered likelihood of midair collisions.

In general terms, the benefits of an effective airborne traffic alert and collision avoidance system in reducing the risk of midair collisions system in reducing the risk of midair collisions have been obvious for many years. As air traffic continues to increase and concentrate at terminal areas, the growing consensus of both the general public and most aviation professionals is that such a system would be a valuable safety addition. In 1987, congress determined that requiring TCAS II in most large aircraft is in the public interest. Although experienced airspace system operators also agree that the system would be beneficial, accurately quantifying benefits is difficult because (fortunately) there have been few actual Part 121 midair collisions in recent years. At the time of the notice, the FAA developed a mathematical model to assess the increase in collision risk that would result from the projected growth in aviation traffic activity. The FAA used a "square law model" to forecast that four midair collisions involving a large airplane and 24 midair collisions of taxi and commuter airplanes would occur if no additional safety measures were taken to offset the affects of traffic growth. Since that time, the FAA has analyzed the issue further, and has concluded that although the "square law model" is simple to apply and yields specific results, the air traffic control system is too complex for the model to be expected to provide reasonably accurate results. For this reason, the FAA has changed the basis of its benefits analysis for the final rule. The fact is, that given the very few midair collisions involving large aircraft that have occurred in recent years, and given the air traffic control improvements that have occurred

and will occur shortly (such as new Mode C requirements), it is not possible to reasonably forecast specific numbers of future midair collisions. Also, the FAA is unable to allocate specific numbers of future midair collisions that will be avoided in the future between the new Mode C requirements and this TCAS rule. Instead of attempting to do this, the FAA has chosen to estimate a range of midair collisions that may occur. Currently, the stage is set for a midair collision only when one or both pilots of two aircraft make a mistake *and* the ATC system fails *and* TCAS fails. In the enroute system, TCAS plays a somewhat stronger role where ATC radar coverage does not exist.

The above factors tend to reduce the number of future midair collisions. On the other hand, steadily increasing traffic levels tend to increase the risk. In an attempt to estimate the range of midair collisions within which the actual number of future midair collisions of large aircraft will fall, the FAA employed a Poisson distribution. Based on a history of two collisions in the recent past, the Poisson distribution indicates that there is a 60 percent probability two or more collisions in the future forecast period, and a 95 percent probability that the number will not exceed seven. The FAA believes that the range of two to seven is a reasonable expectation of the number of midair collisions involving a large aircraft during the next 15 years. In monetary terms, over the subject time period, this rule is expected to accrue potential benefits ranging between $207 million and $724 million (discounted, in 1987 dollars).

A similar analysis of the number of Part 135 midair collisions that may be avoided through TCAS I yields a range of 4 to 14 during the 15-year analysis period. Based on the moderate cost of TCAS I, this part of the rule is cost-beneficial throughout the range of potential midair collisions avoided. For example, in monetary terms, over the subject time period, this rule is expected to accrue potential benefits ranging between $27 million and $97 million (discounted, in 1987 dollars), compared to costs of $18 million (which included $2 million for the Mode C rule).

In view of the aforementioned discussion on benefits for Parts 121 (including Part 125) and 135, the FAA believes that a share of the potential benefits expected to accrue from implementation of this rule must be attributed to the Mode C rule, though to what extent is not known. This situation is due to the belief that the benefits of the TCAS and Mode C rules are inextricably linked.

Comparison of Parts 121 and 135 Costs and Benefits

Addressing only 14 CFR Parts 121 and 135 costs and benefits of this TCAS rule, the cost of compliance is estimated to be $563 million and $18 million, respectively (discounted) in 1987 dollars. The benefits of this rule, however, are difficult to quantify for two reasons. The first is associated with the uncertainty of estimating the number of midair collisions that will occur in the future absent any improvements in the airspace system over and above what currently exists. This difficulty has already been discussed at length in the detailed regulatory evaluation and the FAA has chosen to consider ranges of 2 to 7 and 4 to 14 collisions involving Parts 121 and 135 operators, respectively, may occur in the forecast period.

The second reason benefits are difficult to forecast accurately is that at about the same time this rule becomes effective a separate rule will become effective expanding Mode C requirements. Both rules are aimed at reducing the risk of midair collisions and are inextricably linked. The FAA is unable at this time to document the separate impacts of these two rules in reducing the risk.

The FAA made an earlier estimate of the dollar value benefits associated with avoiding future midair collisions as part of its evaluation of the Mode C rule. That estimate was significantly lower than the updated estimate prepared for this rule. The difference is only partly explained by the fact that the Mode C rule estimate was for a 10-year period while the estimate for this rule covers a 15-year period into the future (to allow for the relatively long periods before compliance is required).

Both evaluations used a Poisson distribution model as a basis to estimate the number of future midair collisions that might be expected in the absence of any further airspace system improvements to prevent them. In the Mode C analysis, the FAA very conservatively accepted the low side of the distribution (two accidents) in calculating benefits. However, based on the belief that U.S. commercial aircraft operations are forecast to more than double during the analysis period, the FAA now believes that a better approach is to analyze a range of values.

In view of the difficulties discussed above, the FAA believes that the most realistic approach to comparing benefits and costs is to compare the total Part 121 costs of the TCAS rule plus the

Mode C rule with the full estimated range of possible Part 121 benefits. In a similar manner, total Part 135 TCAS rule plus Mode C rule are compared to the total range of Part 135 benefits.

In the case of Part 121 operator, the cost of the Mode C rule is negligible because virtually all Part 121 aircraft are already in compliance with the rule. Table 1 shows the cost of saving one life through the range of estimated Part 121 midair collisions. As indicated in the table, these cost-per-life-saved figures are based on an estimated total Part 121 TCAS cost of $563 million and no attempt was made to allocate some benefits to the Mode C rule. (A similar exercise can be performed for Part 135 from Table 1.)

TABLE 1

Estimated TCAS II (Part 121) and TCAS I (Part 135) Cost of Saving Lives

(1987 Dollars)

Range of potential midair collisions		Estimated discounted benefits (TCAS plus Mode C rules) ($ millions)		Estimated cost of saving one life in ($ thousands)	
Part 121	Part 135	Part 121	Part 135	Part 121	Part 135
7	14	$724	$97	$ 710	$ 0
6	12	621	83	880	20
5	10	517	69	1,120	70
4	8	414	55	1,480	120
3	6	310	42	2,080	290
2	4	207	27	3,280	550
1	2	103	14	6,830	1,360

The FAA concludes that this TCAS rule is warranted because it will contribute to an overall enhancement of transport and commuter categories airplane safety and utility which will both promote and enhance public confidence in, and utilization of, the U.S. air transportation system. Although the FAA has not yet quantified the value of public confidence in air transportation, it believes there is a very real cost to the system when public confidence is reduced through media coverage of each major midair collision tragedy. The fragility of public confidence is difficult to quantify, but the potential benefits in this regard stemming from avoidance of a major midair collision is very real and substantial. For example, the near-to-midair term loss of passenger bookings following the publicity of a midair collision is readily acknowledged within the industry. Even a special Government safety review of a particular air carrier can have a temporary adverse impact on yields. The qualitative nature of this consideration does not render it less significant as a factor in determining to proceed with the TCAS rulemaking action.

The Regulatory Impact Analysis that has been placed in the docket contains detailed information related to the potential costs and benefits of those amendments to Parts 121, 125, and 135 that are expected to accrue from implementation of this rule.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 requires a review of rules to assess their impact on small business. In consideration of the cost information discussion under the Regulatory Impact Analysis, the FAA concludes that these amendments to Parts 121, 125, and 135 will have a significant economic impact on a substantial number of small entities. However, the FAA finds that there are no viable alternatives for small air carriers to adopt that will reduce the cost of compliance yet achieve the levels of protection sought by these amendments. It can be pointed out, however, that the majority of small entities affected by this rule are Part 135 operators (small air taxis and small commuters). These small businesses will have 6 years to comply with this rule (as opposed to 3 years for Parts 121 and 125 operators). The average total cost impact of this rule on a small air taxi operator or small commuter

for TCAS I units is estimated at $36,000 (or $4,700 annualized) and $76,000 (or $10,000 annualized), respectively, over the 15-year period 1989 to 2003. For Parts 121 and 125 operators, the average total cost for TCAS II units is estimated to be $734,000 (or $96,000 annualized) over the 15-year period.

International Trade Impact Statement

These amendments will have little or no impact on trade opportunities of U.S. firms doing business overseas or for foreign firms doing business in the United States. These rules will impose the same requirements on both domestic operators under Parts 121, 125, and 135 of the FAR and foreign air carriers subject to Part 129. The cost of compliance with these rule amendments to foreign carriers flying into the United States under Part 129 is likely to be very similar to the cost incurred by domestic operators. Thus, neither domestic nor foreign air carriers will be affected disproportionately by these amendments. These rules, therefore, will not cause a competitive fare disadvantage for U.S. carriers operating overseas or for foreign carriers operating in the United States.

Federalism Implications

The regulations adopted herein would not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Thus, in accordance with Executive Order 12612, it is determined that such regulations do not have federalism implications warranting the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Regulatory Flexibility Determination, and the International Trade Impact Analysis, the FAA has determined that this rule is a major rule under Executive Order 12291. In addition, in consideration of the cost information discussion under the Regulatory Impact Analysis, the amendments to Parts 121, 125, and 135 will have a significant economic impact on a substantial number of small entities. This rule is considered significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A regulatory impact analysis of this final rule, including a Regulatory Flexibility Determination and International Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT."

The Amendments

In consideration of the foregoing, the Federal Aviation Administration amends Parts 1, 91, 121, 125, 129, and 135 of the Federal Aviation Regulations (14 CFR Parts 1, 91, 121, 125, 129, and 135) effective February 9, 1989.

The authority citation for Part 125 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Part 125—Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More

Subpart A—General

§ 125.1 Applicability.

[(a) Except as provided in paragraphs (b) and (c) of this section, this part prescribes rules governing the operations of U.S.-registered civil airplanes which have a seating configuration of 20 or more passengers, or a maximum payload capacity of 6,000 pounds or more when common carriage is not involved.]

(b) The rules of this Part do not apply to the operations of airplanes specified in paragraph (a) when—

[(1) They are required to be operated under Part 121, 129, 135 or 137 of this chapter;]

(2) They have been issued restricted, limited, or provisional airworthiness certificates, special flight permits, or experimental certificates;

[(3) They are being operated by a Part 125 certificate holder without carrying passengers or cargo under Part 91 for training, ferrying, positioning, or maintenance purposes;]

[(4) They are being operated under Part 91 by an operator certificated to operate those airplanes under Part 121, 135, or 137 of this chapter or are being operated by a foreign air carrier or a foreign person in common carriage solely outside the United States under Part 91 of this chapter; or]

(5) They are being operated under a deviation authority issued under § 125.3 of this chapter.

(c) The rules of this Part, except § 125.247, do not apply to the operation of airplanes specified in paragraph (a) when they are operated outside the United States by a person who is not a citizen of the United States.

§ 125.3 Deviation authority.

(a) The Associate Administrator for Aviation Standards may, upon consideration of the circumstances of a particular operation, issue deviation authority providing relief from specified sections of Part 125. This deviation authority will be issued as a Letter of Deviation Authority.

(b) A Letter of Deviation Authority may be terminated or amended at any time by the Associate Administrator for Aviation Standards.

(c) A request for deviation authority must be submitted to the Department of Transportation, Federal Aviation Administration, Associate Administrator for Aviation Standards, 800 Independence Ave., S.W., Washington, D.C. 20591, not less than 60 days prior to the date of intended operations. A request for deviation authority must contain a complete statement of the circumstances and justification for the deviation requested.

§ 125.5 Operating certificate and operations specifications required.

(a) After February 3, 1981, no person may engage in operations governed by this Part unless that person holds a certificate and operations specification or appropriate deviation authority.

(b) Applicants who file an application before June 1, 1981, shall continue to operate under the rules applicable to their operations on February 2, 1981, until the application for an operating certificate required by this Part has been denied or the operating certificate and operations specifications required by this Part have been issued.

(c) The rules of this Part which apply to a certificate holder also apply to any person who engages in any operation governed by this Part without an appropriate certificate and operations specifications required by this Part or a Letter of Deviation Authority issued under § 125.3.

§ 125.7 Display of Certificate.

(a) The certificate holder must display a true copy of the certificate in each of its aircraft.

(b) Each operator holding a Letter of Deviation Authority issued under this Part must carry a true copy in each of its airplanes.

§ 125.9 Definitions.

(a) For the purposes of this Part, "maximum payload capacity" means:

(1) For an airplane for which a maximum zero fuel weight is prescribed in FAA technical specifications, the maximum zero fuel weight, less empty weight, less all justifiable airplane equipment, and less the operating load (consisting of minimum flightcrew, foods and beverages and supplies and equipment related to foods and beverages, but not including disposable fuel or oil);

(2) For all other airplanes, the maximum certificated takeoff weight of an airplane, less the empty weight, less all justifiable airplane equipment, and less the operating load (consisting of minimum fuel load, oil, and flightcrew). The allowance for the weight of the crew, oil, and fuel is as follows:

(i) Crew—200 pounds for each crewmember required under this chapter.

(ii) Oil—350 pounds.

(iii) Fuel—the minimum weight of fuel required under this chapter for a flight between domestic points 174 nautical miles apart under VFR weather conditions that does not involve extended overwater operations.

(b) For the purposes of this Part "empty weight" means the weight of the airframe, engines, propellers, and fixed equipment. Empty weight excludes the weight of the crew and payload, but includes the weight of all fixed ballast, unusable fuel supply, undrainable oil, total quantity of engine coolant, and total quantity of hydraulic fluid.

(c) For the purposes of this Part, "maximum zero fuel weight" means the maximum permissible weight of an airplane with no disposable fuel or oil. The zero fuel weight figure may be found in either the airplane type certificate data sheet or the approved Airplane Flight Manual, or both.

(d) For the purposes of this section, "justifiable airplane equipment" means any equipment necessary for the operation of the airplane. It does not include equipment or ballast specifically installed, permanently or otherwise, for the purpose of altering the empty weight of an airplane to meet the maximum payload capacity.

§ 125.11 Certificate eligibility and prohibited operations.

(a) [No person is eligible for a certificate or operations specifications under this part if that person holds the appropriate operating certificate and/or operations specifications necessary to conduct operations under Part 121, 129, or 135 of this chapter.]

(b) No certificate holder may conduct any operation which results directly or indirectly from any person's holding out to the public to furnish transportation.

[(c)] No person holding operations specificatons under this part may operate or list on its operations specifications any aircraft listed on any operations specifications or other required aircraft listing under Part 121, 129, or 135 of this chapter.]

Subpart B—Certification Rules and Miscellaneous Requirements

§ 125.21 Application for operating certificate.

(a) Each applicant for the issuance of an operating certificate must submit an application in a form and manner prescribed by the Administrator to the FAA Flight Standards district office in whose area the applicant proposes to establish or has established its principal operations base. The application must be submitted at least 60 days before the date of intended operations.

(b) Each application submitted under paragraph (a) of this section must contain a signed statement showing the following:

(1) The name and address of each director and each officer or person employed or who will be employed in a management position described in § 125.25.

(2) A list of flight crew members with the type of airman certificate held, including ratings and certificate numbers.

§ 125.23 Rules applicable to operations subject to this Part.

Each person operating an airplane in operations under this Part shall—

(a) While operating inside the United States, comply with the applicable rules in Part 91 of this chapter; and

(b) While operating outside the United States, comply with Annex 2, Rules of the Air, to the Convention on International Civil Aviation or the regulations of any foreign country, whichever applies, and with any rules of Parts 61 and 91 of this chapter and this Part that are more restrictive than that Annex or those regulations and that can be complied with without violating that Annex or those regulations. Annex 2 is incorporated by reference in § 91.1(c) of this chapter.

§ 125.25 Management personnel required.

(a) Each applicant for a certificate under this Part must show that it has enough management personnel, including at least a director of operations, to assure that its operations are conducted in accordance with the requirements of this Part.

(b) Each applicant shall—

(1) Set forth the duties, responsibilities, and authority of each of its management personnel in the general policy section of its manual;

(2) List in the manual the names and addresses of each of its management personnel;

(3) Designate a person as responsible for the scheduling of inspections required by the manual and for the updating of the approved weight and balance system on all airplanes.

(c) Each certificate holder shall notify the FAA Flight Standards district office charged with the overall inspection of the certificate holder of any change made in the assignment of persons to the listed positions within 10 days, excluding Saturdays, Sundays, and Federal holidays, of such change.

§ 125.27 Issue of certificate.

(a) An applicant for a certificate under this subpart is entitled to a certificate if the Administrator finds that the applicant is properly and adequately equipped and able to conduct a safe operation in accordance with the requirements of this Part and the operations specifications provided for in this Part.

(b) The Administrator may deny an application for a certificate under this subpart if the Administrator finds—

(1) That an operating certificate required under this Part or Part 121, 123, or 135 of this chapter previously issued to the applicant was revoked; or

(2) That a person who was employed in a management position under § 125.25 of this Part with (or has exercised control with respect to) any certificate holder under Part 121, 123, 125 or 135 of this chapter whose operating certificate has been revoked, will be employed in any of those positions or a similar position with the applicant and that the person's employment or control contributed materially to the reasons for revoking that certificate.

§ 125.29 Duration of certificate.

(a) A certificate issued under this Part is effective until surrendered, suspended, or revoked.

(b) The Administrator may suspend or revoke a certificate under section 609 of the Federal Aviation Act of 1958 and the applicable procedures of Part 13 of this chapter for any cause that, at the time of suspension or revocation, would have been grounds for denying an application for a certificate.

(c) If the Administration suspends or revokes a certificate or it is otherwise terminated, the holder of that certificate shall return it to the Administrator.

§ 125.31 Contents of certificate and operations specifications.

(a) Each certificate issued under this Part contains the following:

(1) The holder's name.

(2) A description of the operations authorized.

(3) The date it is issued.

(b) The operations specifications issued under this Part contain the following:

(1) The kind of operations authorized.

(2) The types and registration numbers of airplanes authorized for use.

(3) Approval of the provisions of the operator's manual relating to airplane inspections, together with necessary conditions and limitations.

(4) Registration numbers of airplanes that are to be inspected under an approved airplane inspection program under § 125.247.

(5) Procedures for control of weight and balance of airplanes.

(6) Any other item that the Administrator determines is necessary to cover a particular situation.

§ 125.33 Operations specifications not a part of certificate.

Operations specifications are not a part of an operating certificate.

§ 125.35 Amendment of operations specifications.

(a) The FAA Flight Standards district office charged with the overall inspection of the certificate holder may amend any operations specifications issued under this Part if—

(1) It determines that safety in air commerce requires that amendment; or

(2) Upon application by the holder, that district office determines that safety in air commerce allows that amendment.

(b) The certificate holder must file an application to amend operations specifications at least 15 days before the date proposed by the applicant for the amendment to become effective, unless a shorter filing period is approved. The application must be on a form and in a manner prescribed by the Administrator and be submitted to the FAA Flight Standards district office charged with the overall inspection of the certificate holder.

(c) Within 30 days after a notice of refusal to approve a holder's application for amendment is received, the holder may petition the Director of Airworthiness or the Director of Flight Operations, as appropriate, to reconsider the refusal to amend.

(d) When the FAA Flight Standards district office charged with the overall inspection of the certificate holder amends operations specifications, that district office gives notice in writing to the holder of a proposed amendment to the operations specifications, fixing a period of not less than 7 days within which the holder may submit written information, views, and arguments concerning the proposed amendment. After consideration of all relevant matter presented, that district office notifies the holder of any amendment adopted, or a rescission of the notice. That amendment becomes effective not less than 30 days after the holder receives notice of the adoption of the amendment, unless the holder petitions the Director of Airworthiness or the Director of Flight Operations, as appropriate, for reconsideration of the amendment. In that case, the effective date of the amendment is stayed pending a decision by the Director. If the Director finds there is an emergency requiring immediate action as to safety in air commerce that makes the provisions of this pargraph impracticable or contrary to the public interest, the Director notifies the certificate holder that the amendment is effective on the date of receipt, without previous notice.

§125.37 Duty time limitations.

(a) Each flight crewmember must be relieved from all duty for at least 8 consecutive hours during any 24-hour period.

(b) The Administrator may specify rest, flight time, and duty time limitations in the operations specifications that are other than those specified in paragraph (a) of this section.

§ 125.39 Carriage of narcotic drugs, marihuana, and depressant or stimulant drugs or substances.

If the holder of a certificate issued under this Part permits any airplane owned or leased by that holder to be engaged in any operation that the certificate holder knows to be in violation of § 91.12(a) of this chapter, that operation is a basis for suspending or revoking the certificate.

§ 125.41 Availability of certificate and operations specifications.

Each certificate holder shall make its operating certificate and operations specifications available for inspection by the Administrator at its principal operations base.

§ 125.43 Use of operations specifications.

(a) Each certificate holder shall keep each of its employees informed of the provisions of its operations specifications that apply to the employee's duties and responsibilities.

(b) Each certificate holder shall maintain a complete and separate set of its operations specifications. In addition, each certificate holder shall insert pertinent excerpts of its operations specifications, or reference thereto, in its manual in such a manner that they retain their identity as operations specifications.

§ 125.45 Inspection authority.

Each certificate holder shall allow the Administrator, at any time or place, to make any inspections or tests to determine its compliance with the Federal Aviation Act of 1958, the Federal Aviation Regulations, its operating certificate and operations specifications, its letter of deviation authority, or its eligibility to continue to hold its certificate or its letter of deviation authority.

§ 125.47 Change of address.

Each certificate holder shall notify the FAA Flight Standards district office charged with the overall inspection of its operations, in writing, at least 30 days in advance, of any change in the address of its principal business office, its principal operations base, or its principal maintenance base.

§ 125.49 Airport requirements.

(a) No certificate holder may use any airport unless it is adequate for the proposed operation, considering such items as size, surface, obstructions, and lighting.

(b) No pilot of an airplane carrying passengers at night may take off from, or land on, an airport unless—

(1) That pilot has determined the wind direction from an illuminated wind direction indicator or local ground communications, or, in the case of takeoff, that pilot's personal observations; and

(2) The limits of the area to be used for landing or takeoff are clearly shown by boundary or runway marker lights.

(c) For the purposes of paragraph (b) of this section, if the area to be used for takeoff or landing is marked by flare pots or lanterns, their use must be approved by the Administrator.

§ 125.51 En route navigational facilities.

(a) Except as provided in paragraph (b) of this section, no certificate holder may conduct any operation over a route unless nonvisual ground aids are—

(1) Available over the route for navigating airplanes within the degree of accuracy required for ATC; and

(2) Located to allow navigation to any airport of destination, or alternate airport, within the degree of accuracy necessary for the operation involved.

(b) Nonvisual ground aids are not required for—

(1) Day VFR operations that can be conducted safely by pilotage because of the characteristics of the terrain;

(2) Night VFR operations on routes that the Administrator determines have reliable landmarks adequate for safe operation; or

(3) Operations where the use of celestial or other specialized means of navigation, such as an inertial navigation system, is approved.

§ 125.53 Flight locating requirements.

(a) Each certificate holder must have procedures established for locating each flight for which an FAA flight plan is not filed that—

(1) Provide the certificate holder with at least the information required to be included in a VFR flight plan;

(2) Provide for timely notification of an FAA facility or search and rescue facility, if an airplane is overdue or missing; and

(3) Provide the certificate holder with the location, date, and estimated time for reestablishing radio or telephone communications, if the flight will operate in an area where communications cannot be maintained.

(b) Flight locating information shall be retained at the certificate holder's principal operations base, or at other places designated by the certificate holder in the flight locating procedures, until the completion of the flight.

(c) Each certificate holder shall furnish the representative of the Administrator assigned to it with a copy of its flight locating procedures and any changes or additions, unless those procedures are included in a manual required under this Part.

Subpart C—Manual Requirements

§ 125.71 Preparation.

(a) Each certificate holder shall prepare and keep current a manual setting forth the certificate holder's procedures and policies acceptable to the Administrator. This manual must be used by the certificate holder's flight, ground, and maintenance personnel in conducting its operations. However, the Administrator may authorize a deviation from this paragraph if the Administrator finds that, because of the limited size of the operation, all or part of the manual is not necessary for guidance of flight, ground, or maintenance personnel.

(b) Each certificate holder shall maintain at least one copy of the manual at its principal operations base.

(c) The manual must not be contrary to any applicable Federal regulations, foreign regulation applicable to the certificate holder's operations in foreign countries, or the certificate holder's operating certificate or operations specifications.

(d) A copy of the manual, or appropriate portions of the manual (and changes and additions) shall be made available to maintenance and ground operations personnel by the certificate holder and furnished to—

(1) Its flight crewmembers; and

(2) The FAA Flight Standards district office charged with the overall inspection of its operations.

(e) Each employee of the certificate holder to whom a manual or appropriate portions of it are furnished under paragraph (d) (1) of this section shall keep it up to date with the changes and additions furnished to them.

(f) Except as provided in paragraph (g) of this section, each certificate holder shall carry appropriate parts of the manual in each airplane when away from the principal operations base. The appropriate parts must be available for use by ground or flight personnel. If a certificate holder carries aboard an airplane all or any portion of the maintenance part of its manual in microfilm, it must also carry a reading device that provides a legible facsimile image of the microfilmed maintenance information and instructions.

(g) If a certificate holder conducts airplane inspections or maintenance at specified stations where it keeps the approved inspection program manual, it is not required to carry the manual aboard the airplane en route to those stations.

§ 125.73 Contents.

Each manual shall have the date of the last revision and revision number on each revised page. The manual must include—

(a) The name of each management person who is authorized to act for the certificate holder, the person's assigned area of responsibility, and the person's duties, responsibilities, and authority;

(b) Procedures for ensuring compliance with airplane weight and balance limitations;

(c) Copies of the certificate holder's operations specifications or appropriate extracted information, including area of operations authorized, category and class of airplane authorized, crew complements, and types of operations authorized;

(d) Procedures for complying with accident notification requirements;

(e) Procedures for ensuring that the pilot in command knows that required airworthiness inspections have been made and that the airplane has been approved for return to service in compliance with applicable maintenance requirements;

(f) Procedures for reporting and recording mechanical irregularities that come to the attention of the pilot in command before, during, and after completion of a flight;

(g) Procedures to be followed by the pilot in command for determining that mechanical irregularities or defects reported for previous flights have been corrected or that correction has been deferred;

(h) Procedures to be followed by the pilot in command to obtain maintenance, preventive maintenance, and servicing of the airplane at a place where previous arrangements have not been made by the operator, when the pilot is authorized to so act for the operator;

(i) Procedures for the release for, or continuation of, flight if any item of equipment required for the particular type of operation becomes inoperative or unserviceable en route;

(j) Procedures for refueling airplanes, eliminating fuel contamination, protecting from fire (including electrostatic protection), and supervising and protecting passengers during refueling;

(k) Procedures to be followed by the pilot in command in the briefing under § 125.327;

(l) Flight locating procedures, when applicable;

(m) Procedures for ensuring compliance with emergency procedures, including a list of the functions assigned each category of required crewmembers in connection with an emergency and emergency evacuation;

(n) The approved airplane inspection program;

(o) Procedures and instructions to enable personnel to recognize hazardous materials, as defined in Title 49 CFR, and if these materials are to be carried, stored, or handled, procedures and instructions for—

(1) Accepting shipment of hazardous material required by Title 49 CFR, to assure proper packaging, marking, labeling, shipping documents, compatibility of articles, and instructions on their loading, storage, and handling;

(2) Notification and reporting hazardous material incidents as required by Title 49 CFR; and

(3) Notification of the pilot in command when there are hazardous materials aboard, as required by Title 49 CFR;

(p) Procedures for the evacuation of persons who may need the assistance of another person to move expeditiously to an exit if an emergency occurs;

(q) The identity of each person who will administer tests required by this Part, including the designation of the tests authorized to be given by the person; and

(r) Other procedures and policy instructions regarding the certificate holder's operations that are issued by the certificate holder.

§ 125.75 Airplane flight manual.

(a) Each certificate holder shall keep a current approved Airplane Flight Manual or approved equivalent for each type airplane that it operates.

(b) Each certificate holder shall carry the approved Airplane Flight Manual or the approved equivalent aboard each airplane it operates. A certificate holder may elect to carry a combination of the manuals required by this section and § 125.71. If it so elects, the certificate holder may revise the operating procedures sections and modify the presentation of performance from the applicable Airplane Flight Manual if the revised operating procedures and modified performance data presentation are approved by the Administrator.

Subpart D—Airplane Requirements

§ 125.91 Airplane requirements: general.

(a) No certificate holder may operate an airplane governed by this Part unless it—

(1) Carries an appropriate current airworthiness certificate issued under this chapter; and

(2) Is in an airworthy condition and meets the applicable airworthiness requirements of this chapter, including those relating to identification and equipment.

(b) No person may operate an airplane unless the current empty weight and center of gravity are calculated from the values established by actual weighing of the airplane within the preceding 36 calendar months.

(c) Paragraph (b) of this section does not apply to airplanes issued an original airworthiness certificate within the preceding 36 calendar months.

§ 125.93 Airplane limitations.

No certificate holder may operate a land airplane (other than a DC-3, C-46, CV-240, CV-340, CV-440, CV-580, CV-600, CV-640, or Martin 404) in an extended overwater operation unless it is certificated or approved as adequate for ditching under the ditching provisions of Part 25 of this chapter.

Subpart E—Special Airworthiness Requirements

§ 125.111 General.

(a) Except as provided in paragraph (b) of this section, no certificate holder may use an airplane powered by airplane engines rated at more than 600 horsepower each for maximum continuous operation unless that airplane meets the requirements of §§ 125.113 through 125.181.

(b) If the Administrator determines that, for a particular model of airplane used in cargo service, literal compliance with any requirement under paragraph (a) of this section would be extremely difficult and that compliance would not contribute materially to the objective sought, the Administrator may require compliance with only those requirements that are necessary to accomplish the basic objectives of this Part.

(c) This section does not apply to any airplane certificated under—

(1) Part 4b of the Civil Air Regulations in effect after October 31, 1946;

(2) Part 25 of this chapter; or

(3) Special Civil Air Regulation 422, 422A, or 422B.

§ 125.113 Cabin interiors.

(a) Upon the first major overhaul of an airplane cabin or refurbishing of the cabin interior, all materials in each compartment used by the crew or passengers that do not meet the following requirements must be replaced with materials that meet these requirements:

(1) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, § 25.853 in effect on April 30, 1972.

(2) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the materials requirement under which the airplane was type certificated.

(b) Except as provided in paragraph (a) of this section, each compartment used by the crew or passengers must meet the following requirements:

(1) Materials must be at least flash resistant.

(2) The wall and ceiling linings and the covering of upholstering, floors, and furnishings must be flame resistant.

(3) Each compartment where smoking is to be allowed must be equipped with self-contained ash trays that are completely removable and other compartments must be placarded against smoking.

(4) Each receptacle for used towels, papers, and wastes must be of fire-resistant material and must have a cover or other means of containing possible fires started in the receptacles.

§ 125.115 Internal doors.

In any case where internal doors are equipped with louvres or other ventilating means, there must be a means convenient to the crew for closing the flow of air through the door when necessary.

§ 125.117 Ventilation.

Each passenger or crew compartment must be suitably ventilated. Carbon monoxide concentration may not be more than one part in 20,000 parts of air, and fuel fumes may not be present. In any case where partitions between compartments have louvres or other means allowing air to flow between compartments, there must be a means convenient to the crew for closing the flow of air through the partitions when necessary.

§ 125.119 Fire precautions.

(a) Each compartment must be designed so that, when used for storing cargo or baggage, it meets the following requirements:

(1) No compartment may include controls, wiring, lines, equipment, or accessories that would upon damage or failure, affect the safe operation of the airplane unless the item is adequately shielded, isolated, or otherwise protected so that it cannot be damaged by movement of cargo in the compartment and so that damage to or failure of the item would not create a fire hazard in the compartment.

(2) Cargo or baggage may not interfere with the functioning of the fire-protective features of the compartment.

(3) Materials used in the construction of the compartments, including tie-down equipment, must be at least flame resistant.

(4) Each compartment must include provisions for safeguarding against fires according to the classifications set forth in paragraphs (b) through (f) of this section.

(b) *Class A.* Cargo and baggage compartments are classified in the "A" category if a fire therein would be readily discernible to a member of the crew while at that crewmember's station, and all parts of the compartment are easily accessible in flight. There must be a hand fire extinguisher available for each Class A compartment.

(c) *Class B.* Cargo and baggage compartments are classified in the "B" category if enough access is provided while in flight to enable a member of the crew to effectively reach all of the compartment and its contents with a hand fire extinguisher and the compartment is so designed that, when the access provisions are being used, no hazardous amount of smoke, flames, or extinguishing agent enters any compartment occupied by the crew or passengers. Each Class B compartment must comply with the following:

(1) It must have a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station.

(2) There must be a hand-held fire extinguisher available for the compartment.

(3) It must be lined with fire-resistant material, except that additional service lining of flame-resistant material may be used.

(d) *Class C.* Cargo and baggage compartments are classified in the "C" category if they do not conform with the requirements for the "A", "B", "D", or "E" categories. Each Class C compartment must comply with the following:

(1) It must have a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station.

(2) It must have an approved built-in fire-extinguisher system controlled from the pilot or flight engineer station.

(3) It must be designed to exclude hazardous quantities of smoke, flames, or extinguishing agents from entering into any compartment occupied by the crew or passengers.

(4) It must have ventilation and draft control so that the extinguishing agent provided can control any fire that may start in the compartment.

(5) It must be lined with fire-resistant material, except that additional service lining of flame-resistant material may be used.

(e) *Class D.* Cargo and baggage compartments are classified in the "D" category if they are so designed and constructed that a fire occurring therein will be completely confined without endangering the safety of the airplane or the occupants. Each Class D compartment must comply with the following:

(1) It must have a means to exclude hazardous quantities of smoke, flames, or noxious gases from entering any compartment occupied by the crew or passengers.

(2) Ventilation and drafts must be controlled within each compartment so that any fire likely to occur in the compartment will not progress beyond safe limits.

(3) It must be completely lined with fire-resistant material.

(4) Consideration must be given to the effect of heat within the compartment on adjacent critical parts of the airplane.

(f) *Class E.* On airplanes used for the carriage of cargo only, the cabin area may be classified as a Class "E" compartment. Each Class E compartment must comply with the following:

(1) It must be completely lined with fire-resistant material.

(2) It must have a separate system of an approved type smoke or fire detector to give warning at the pilot or flight engineer station.

(3) It must have a means to shut off the ventilating air flow to or within the compartment and the controls for that means must be accessible to the flightcrew in the crew compartment.

(4) It must have a means to exclude hazardous quantities of smoke, flames, or noxious gases from entering the flightcrew compartment.

(5) Required crew emergency exits must be accessible under all cargo loading conditions.

§ 125.121 Proof of compliance with § 125.119.

Compliance with those provisions of § 125.119 that refer to compartment accessibility, the entry of hazardous quantities of smoke or extinguishing agent into compartment occupied by the crew or passengers, and the dissipation of the extinguishing agent in Class "C" compartments must be shown by tests in flight. During these tests it must be shown that no inadvertent operation of smoke or fire detectors in other compartments within the airplane would occur as a result of fire contained in any one compartment, either during the time it is being extinguished, or thereafter unless the extinguishing system floods those compartments simultaneously.

§ 125.123 Propeller deicing fluid.

If combustible fluid is used for propeller deicing, the certificate holder must comply with § 125.153.

§ 125.125 Pressure cross-feed arrangements.

(a) Pressure cross-feed lines may not pass through parts of the airplane used for carrying persons or cargo unless there is a means to allow crewmembers to shut off the supply of fuel to these lines or the lines are enclosed in a fuel and fume-proof enclosure that is ventilated and drained to the exterior of the airplane. However, such an enclosure need not be used if those lines incorporate no fittings on or within the personnel or cargo areas and are suitably routed or protected to prevent accidental damage.

(b) Lines that can be isolated from the rest of the fuel system by valves at each end must incorporate provisions for relieving excessive pressures that may result from exposure of the isolated line to high temperatures.

§ 125.127 Location of fuel tanks.

(a) Fuel tanks must be located in accordance with § 125.153.

(b) No part of the engine nacelle skin that lies immediately behind a major air outlet from the engine compartment may be used as the wall of an integral tank.

(c) Fuel tanks must be isolated from personnel compartments by means of fume- and fuel-proof enclosures.

§ 125.129 Fuel system lines and fittings.

(a) Fuel lines must be installed and supported so as to prevent excessive vibration and so as to be adequate to withstand loads due to fuel pressure and accelerated flight conditions.

(b) Lines connected to components of the airplane between which there may be relative motion must incorporate provisions for flexibility.

(c) Flexible connections in lines that may be under pressure and subject to axial loading must use flexible hose assemblies rather than hose clamp connections.

(d) Flexible hoses must be of an acceptable type or proven suitable for the particular application.

§ 125.131 Fuel lines and fittings in designated fire zones.

Fuel lines and fittings in each designated fire zone must comply with § 125.157.

§ 125.133 Fuel valves.

Each fuel valve must—

(a) Comply with § 125.155;

(b) Have positive stops or suitable index provisions in the "on" and "off" positions; and

(c) Be supported so that loads resulting from its operation or from accelerated flight conditions are not transmitted to the lines connected to the valve.

§ 125.135 Oil lines and fittings in designated fire zones.

Oil lines and fittings in each designated fire zone must comply with § 125.157.

§ 125.137 Oil valves.

(a) Each oil valve must—

(1) Comply with § 125.155;

(2) Have positive stops or suitable index provisions in the "on" and "off" positions; and

(3) Be supported so that loads resulting from its operation or from accelerated flight conditions are not transmitted to the lines attached to the valve.

(b) The closing of an oil shutoff means must not prevent feathering the propeller, unless equivalent safety provisions are incorporated.

§ 125.139 Oil system drains.

Accessible drains incorporating either a manual or automatic means for positive locking in the closed position must be provided to allow safe drainage of the entire oil system.

§ 125.141 Engine breather lines.

(a) Engine breather lines must be so arranged that condensed water vapor that may freeze and obstruct the line cannot accumulate at any point.

(b) Engine breathers must discharge in a location that does not constitute a fire hazard in case foaming occurs and so that oil emitted from the line does not impinge upon the pilot's windshield.

(c) Engine breathers may not discharge into the engine air induction system.

§ 125.143 Firewalls.

Each engine, auxiliary power unit, fuel-burning heater, or other item of combusting equipment that is intended for operation in flight must be isolated from the rest of the airplane by means of firewalls or shrouds, or by other equivalent means.

§ 125.145 Firewall construction.

Each firewall and shroud must—

(a) Be so made that no hazardous quantity of air, fluids, or flame can pass from the engine compartment to other parts of the airplane;

(b) Have all openings in the firewall or shroud sealed with close-fitting fireproof grommets, bushings, or firewall fittings;

(c) Be made of fireproof material; and

(d) Be protected against corrosion.

§ 125.147 Cowling.

(a) Cowling must be made and supported so as to resist the vibration, inertia, and air loads to which it may be normally subjected.

(b) Provisions must be made to allow rapid and complete drainage of the cowling in normal ground and flight attitudes. Drains must not discharge in locations constituting a fire hazard. Parts of the cowling that are subjected to high temperatures because they are near exhaust system parts or because of exhaust gas impingement must be made of fireproof material. Unless otherwise specified in these regulations, all other parts of the cowling must be made of material that is at least fire resistant.

§ 125.149 Engine accessory section diaphragm.

Unless equivalent protection can be shown by other means, a diaphragm that complies with § 125.145 must be provided on air-cooled engines to isolate the engine power section and all parts of the exhaust system from the engine accessory compartment.

§ 125.151 Powerplant fire protection.

(a) Designated fire zones must be protected from fire by compliance with §§ 125.153 through 125.159.

(b) Designated fire zones are—

(1) Engine accessory sections;

(2) Installations where no isolation is provided between the engine and accessory compartment; and

(3) Areas that contains auxiliary power units, fuel-burning heaters, and other combustion equipment.

§ 125.153 Flammable fluids.

(a) No tanks or reservoirs that are a part of a system containing flammable fluids or gases may be located in designated fire zones, except where the fluid contained, the design of the system, the materials used in the tank, the shutoff means, and the connections, lines and controls provide equivalent safety.

(b) At least one-half inch of clear airspace must be provided between any tank or reservior and a firewall or shroud isolating a designated fire zone.

§ 125.155 Shutoff means.

(a) Each engine must have a means for shutting off or otherwise preventing hazardous amounts of fuel, oil, deicer, and other flammable fluids from flowing into, within, or through any designated fire zone. However, means need not be provided to shut off flow in lines that are an integral part of an engine.

(b) The shutoff means must allow an emergency operating sequence that is compatible with the emergency operation of other equipment, such as feathering the propeller, to facilitate rapid and effective control of fires.

(c) Shutoff means must be located outside of designated fire zones, unless equivalent safety is provided, and it must be shown that no hazardous amount of flammable fluid will drain into any designated fire zone after a shutoff.

(d) Adequate provisions must be made to guard against inadvertent operation of the shutoff means and to make it possible for the crew to reopen the shutoff means after it has been closed.

§125.157 Lines and fittings.

(a) Each line, and its fittings, that is located in a designated fire zone, if it carries flammable fluids or gases under pressure, or is attached directly to the engine, or is subject to relative motion between components (except lines and fittings forming an integral part of the engine), must be flexible and fire-resistant with fire-resistant, factory-fixed, detachable, or other approved fire-resistant ends.

(b) Lines and fittings that are not subject to pressure or to relative motion between components must be of fire-resistant materials.

§ 125.159 Vent and drain lines.

All vent and drain lines, and their fittings, that are located in a designated fire zone must, if they carry flammable fluids or gases, comply with § 125.157, if the Administrator finds that the rupture or breakage of any vent or drain line may result in a fire hazard.

§ 125.161 Fire-extinguishing systems.

(a) Unless the certificate holder shows that equivalent protection against destruction of the airplane in case of fire is provided by the use of fireproof materials in the nacelle and other components that would be subjected to flame, fire-extinguishing systems must be provided to serve all designated fire zones.

(b) Materials in the fire-extinguishing system must not react chemically with the extinguishing agent so as to be a hazard.

§ 125.163 Fire-extinguishing agents.

Only methyl bromide, carbon dioxide, or another agent that has been shown to provide equivalent extinguishing action may be used as a fire-extinguishing agent. If methyl bromide or any other toxic extinguishing agent is used, provisions must be made to prevent harmful concentrations of fluid or fluid vapors from entering any personnel compartment either because of leakage during normal operation of the airplane or because of discharging the fire extinguisher on the ground or in flight when there is a defect in the extinguishing system. If a methyl bromide system is used, the containers

must be charged with dry agent and sealed by the fire-extinguisher manufacturer or some other person using satisfactory recharging equipment. If carbon dioxide is used, it must not be possible to discharge enough gas into the personnel compartments to create a danger of suffocating the occupants.

§ 125.165 Extinguishing agent container pressure relief.

Extinguishing agent containers must be provided with a pressure relief to prevent bursting of the container because of excessive internal pressures. The discharge line from the relief connection must terminate outside the airplane in a place convenient for inspection on the ground. An indicator must be provided at the discharge end of the line to provide a visual indication when the container has discharged.

§ 125.167 Extinguishing agent container compartment temperature.

Precautions must be taken to ensure that the extinguishing agent containers are installed in places where reasonable temperatures can be maintained for effective use of the extinguishing system.

§ 125.169 Fire-extinguishing system materials.

(a) Except as provided in paragraph (b) of this section, each component of a fire-extinguishing system that is in a designated fire zone must be made of fireproof materials.

(b) Connections that are subject to relative motion between components of the airplane must be made of flexible materials that are at least fire-resistant and be located so as to minimize the probability of failure.

§ 125.171 Fire-detector systems.

Enough quick-acting fire detectors must be provided in each designated fire zone to assure the detection of any fire that may occur in that zone.

§ 125.173 Fire detectors.

Fire detectors must be made and installed in a manner that assures their ability to resist, without failure, all vibration, inertia, and other loads to which they may be normally subjected. Fire detectors must be unaffected by exposure to fumes, oil, water, or other fluids that may be present.

§ 125.175 Protection of other airplane components against fire.

(a) Except as provided in paragraph (b) of this section, all airplane surfaces aft of the nacelles in the area of one nacelle diameter on both sides of the nacelle centerline must be made of material that is at least fire resistant.

(b) Paragraph (a) of this section does not apply to tail surfaces lying behind nacelles unless the dimensional configuration of the airplane is such that the tail surfaces could be affected readily by heat, flames, or sparks emanating from a designated fire zone or from the engine from a designated fire zone or from the engine compartment of any nacelle.

§ 125.177 Control of engine rotation.

(a) Except as provided in paragraph (b) of this section, each airplane must have a means of individually stopping and restarting the rotation of any engine in flight.

(b) In the case of turbine engine installations, a means of stopping rotation need be provided only if the Administrator finds that rotation could jeopardize the safety of the airplane.

§ 125.179 Fuel system independence.

(a) Each airplane fuel system must be arranged so that the failure of any one component does not result in the irrecoverable loss of power of more than one engine.

(b) A separate fuel tank need not be provided for each engine if the certificate holder shows that the fuel system incorporates features that provide equivalent safety.

§ 125.181 Induction system ice prevention.

A means for preventing the malfunctioning of each engine due to ice accumulation in the engine air induction system must be provided for each airplane.

§ 125.183 Carriage of cargo in passenger compartments.

(a) Except as provided in paragraph (b) or (c) of this section, no certificate holder may carry cargo in the passenger compartment of an airplane.

(b) Cargo may be carried aft of the foremost seated passengers if it is carried in an approved cargo bin that meets the following requirements:

(1) The bin must withstand the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed, multiplied by a factor of 1.15, using the combined weight of the bin and the maximum weight of cargo that may be carried in the bin.

(2) The maximum weight of cargo that the bin is approved to carry and any instructions necessary to ensure proper weight distribution within the bin must be conspicuously marked on the bin.

(3) The bin may not impose any load on the floor or other structure of the airplane that exceeds the load limitations of that structure.

(4) The bin must be attached to the seat tracks or to the floor structure of the airplane, and its attachment must withstand the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed, multiplied by either the factor 1.15 or the seat atttachment factor specified for the airplane, whichever is greater, using the combined weight of the bin and the maximum weight of cargo that may be carried in the bin.

(5) The bin may not be installed in a position that restricts access to or use of any required emergency exit, or of the aisle in the passenger compartment.

(6) The bin must be fully enclosed and made of material that is at least flame-resistant.

(7) Suitable safeguards must be provided within the bin to prevent the cargo from shifting under emergency landing conditions.

(8) The bin may not be installed in a position that obscures any passenger's view of the "seat belt" sign, "no smoking" sign, or any required exit sign, unless an auxiliary sign or other approved means for proper notification of the passenger is provided.

(c) All cargo may be carried forward of the foremost seated passengers and carry-on baggage may be carried alongside the foremost seated passengers if the cargo (including carry-on baggage) is carried either in approved bins as specified in paragraph (b) of this section or in accordance with the following:

(1) It is properly secured by a safety belt or other tie down having enough strength to eliminate the possibility of shifting under all normally anticipated flight and ground conditions.

(2) It is packaged or covered in a manner to avoid possible injury to passengers.

(3) It does not impose any load on seats or the floor structure that exceeds the load limitation for those components.

(4) Its location does not restrict access to or use of any required emergency or regular exit, or of the aisle in the passenger compartment.

(5) Its location does not obscure any passenger's view of the "seat belt" sign, "no smoking" sign, or required exit sign, unless an auxiliary sign or other approved means for proper notification of the passenger in provided.

§ 125.185 Carriage of cargo in cargo compartments.

When cargo is carried in cargo compartments that are designed to require the physical entry of a crewmember to extinguish any fire that may occur during flight, the cargo must be loaded so as to allow a crewmember to effectively reach all parts of the compartment with the contents of a hand-held fire extinguisher.

§ 125.187 Landing gear: aural warning device.

(a) Each airplane must have a landing gear aural warning device that functions continuously under the following conditions:

(1) For airplanes with an established approach wing-flap position, whenever the wing flaps are extended beyond the maximum certificated approach climb configuration position in the Airplane Flight Manual and the landing gear is not fully extended and locked.

(2) For airplanes without an established approach climb wing-flap position, whenever the wing flaps are extended beyond the posi-

tion at which landing gear extension is normally performed and the landing gear is not fully extended and locked.

(b) The warning system required by paragraph (a) of this section—

(1) May not have a manual shutoff;

(2) Must be in addition to the throttle-actuated device installed under the type certification airworthiness requirements; and

(3) May utilize any part of the throttle-actuated system including the aural warning device.

(c) The flap position sensing unit may be installed at any suitable place in the airplane.

§ 125.189 Demonstration of emergency evacuation procedures.

(a) Each certificate holder must show, by actual demonstration conducted in accordance with paragraph (a) of Appendix C of this Part, that the emergency evacuation procedures for each type and model of airplane with a seating of more than 44 passengers, that is used in its passenger-carrying operations, allow the evacuation of the full seating capacity, including crewmembers, in 90 seconds or less, in each of the following circumstances:

(1) A demonstration must be conducted by the certificate holder upon the initial introduction of a type and model of airplane into passenger-carrying operations. However, the demonstration need not be repeated for any airplane type or model that has the same number and type of exits, the same cabin configuration, and the same emergency equipment as any other airplane used by the certificate holder in successfully demonstrating emergency evacuation in compliance with this paragraph.

(2) A demonstration must be conducted—

(i) Upon increasing by more than 5 percent the passenger seating capacity for which successful demonstration has been conducted; or

(ii) Upon a major change in the passenger cabin interior configuration that will affect the emergency evacuation of passengers.

(b) If a certificate holder has conducted a successful demonstration required by § 121.291(a) in the same type airplane as a Part 121 or 123 certificate holder, it need not conduct a demonstration under this paragraph in that type airplane to achieve certification under Part 125.

(c) Each certificate holder operating or proposing to operate one or more landplanes in extended overwater operation, or otherwise required to have certain equipment under § 125.209, must show, by a simulated ditching conducted in accordance with paragraph (b) of Appendix B of this Part, that it has the ability to efficiently carry out its ditching procedures.

(d) If a certificate holder has conducted a successful demonstration required by § 121.291(b) in the same type airplane as a Part 121 or 123 certificate holder, it need not conduct a demonstration under this paragraph in that type airplane to achieve certification under Part 125.

Subpart F—Instrument and Equipment Requirements

§ 125.201 Inoperable instruments and equipment.

(a) No person may take off an airplane unless the following instruments and equipment are in an operable condition:

(1) Instruments and equipment that are either specifically or otherwise required by the airworthiness requirements under which the airplane is type certificated and which are essential for safe operations under all operating conditions.

(2) Instruments and equipment required by an airworthiness directive to be in operable condition unless the airworthiness directive provides otherwise.

(b) No person may take off any airplane with inoperable instruments or equipment installed, other than those described in paragraph (a) of this section unless the following conditions are met:

(1) An approved Minimum Equipment List exists for the airplane type.

(2) The airplane has within it a letter of authorization, issued by the FAA Flight Standards district office having certification responsibility for the certificate holder, authorizing operation of the airplane under the Minimum Equipment List. The letter of

authorization may be obtained by written request of the certificate holder. The Minimum Equipment List and the letter of authorization constitute a supplemental type certificate for the airplane.

(3) The approved Minimum Equipment List must provide for the operation of the airplane with the instruments and equipment in an inoperable condition.

(4) The airplane records available to the pilot must include an entry describing the inoperable instruments and equipment.

(5) The airplane is operated under all applicable conditions and limitations contained in the Minimum Equipment List and the letter authorizing the use of the list.

(c) Without regard to the requirements of paragraph (a) (1) of this section, an airplane with inoperable instruments or equipment may be operated under a special flight permit under §§ 21.197 and 21.199 of this chapter.

§ 125.202 [Removed]

§ 125.203 Radio and navigational equipment.

(a) No person may operate an airplane unless it has two-way radio communications equipment able, at least in flight, to transmit to, and receive from, ground facilities 25 miles away.

(b) No person may operate an airplane over-the-top unless it has radio navigational equipment able to receive radio signals from the ground facilities to be used.

(c) No person may operate an airplane carrying passengers under IFR or in extended over-water operations unless it has at least the following radio communication and navigational equipment appropriate to the facilities to be used which are capable of transmitting to, and receiving from, at any place on the route to be flown, at least one ground facility:

(1) Two transmitters, (2) two microphones, (3) two headsets or one headset and one speaker, (4) a marker beacon receiver, (5) two independent receivers for navigation, and (6) two independent receivers for communications.

(d) For the purposes of paragraphs (c) (5) and (c) (6) of this section, a receiver is independent if the function of any part of it does not depend on the functioning of any part of another receiver. However, a receiver that can receive both communications and navigational signals may be used in place of a separate communications receiver and a separate navigational signal receiver.

§ 125.205 Equipment requirements: airplanes under IFR.

No person may operate an airplane under IFR unless it has—

(a) A vertical speed indicator;

(b) A free-air temperature indicator;

(c) A heated pitot tube for each airspeed indicator;

(d) A power failure warning device or vacuum indicator to show the power available for gyroscopic instruments from each power source;

(e) An alternate source of static pressure for the altimeter and the airspeed and vertical speed indicators;

(f) At least two generators each of which is on a separate engine, or which any combination of one-half of the total number are rated sufficiently to supply the electrical loads of all required instruments and equipment necessary for safe emergency operation of the airplane; and

(g) Two independent sources of energy (with means of selecting either), of which at least one is an engine-driven pump or generator, each of which is able to drive all gyroscopic instruments and installed so that failure of one instrument or source does not interfere with the energy supply to the remaining instruments or the other energy source. For the purposes of this paragraph, each engine-driven source of energy must be on a different engine.

(h) For the purposes of paragraph (f) of this section, a continuous inflight electrical load includes one that draws current continuously during flight, such as radio equipment, electrically driven instruments, and lights, but does not include occasional intermittent loads.

(i) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to icing.

(j) A sensitive altimeter.

(k) Instrument lights providing enough light to make each required instrument, switch, or similar instrument easily readable and installed so that the direct rays are shielded from the flight crewmembers' eyes and that no objectionable reflections are visible to them. There must be a means of controlling the intensity of illumination unless it is shown that nondimming instrument lights are satisfactory.

125.206 Pitot heat indication systems.

(a) Except as provided in paragraph (b) of this section, after April 12, 1981, no person may operate a transport category airplane equipped with a flight instrument pitot heating system unless the airplane is equipped with an operable pitot heat indication system that complies with § 25.1326 of this chapter in effect on April 12, 1978.

(b) A certificate holder may obtain an extension of the April 12, 1981, compliance date specified in paragraph (a) of this section, but not beyond April 12, 1983, from the Director of Flight Operations if the certificate holder—

(1) Shows that due to circumstances beyond its control it cannot comply by the specified compliance date; and

(2) Submits by the specified compliance date a schedule for compliance acceptable to the Director, indicating that compliance will be achieved at the earliest practicable date.

§ 125.207 Emergency equipment requirements.

(a) No person may operate an airplane having a seating capacity of 20 or more passengers unless it is equipped with the following emergency equipment:

(1) One approved first aid kit for treatment of injuries likely to occur in flight or in a minor accident, which meets the following specifications and requirements:

(i) Each first aid kit must be dust and moisture proof and contain only materials that either meet Federal Specifications GGK-391a, as revised, or as approved by the Administrator.

(ii) Required first aid kits must be readily accessible to the cabin flight attendants.

(iii) At time of takeoff, each first aid kit must contain at least the following or other contents approved by the Administrator:

Contents:	Quantity
Adhesive bandage compressors, 1 in	16
Antisepic swabs	20
Ammonia inhalents	10
Bandage compressors, 4 in	8
Triangular bandage compressors, 40 in	5
Burn compound, ⅛ oz or an equivalent of other burn remedy	6
Arm splint, noninflatable	1
Leg splint, noninflatable	1
Roller bandage, 4 in	4
Adhesive tape, 1-in standard roll	2
Bandage scissors	1

(2) A crash axe carried so as to be accessible to the crew but inaccessible to passengers during normal operations.

(3) Signs that are visible to all occupants to notify them when smoking is prohibited and when safety belts should be fastened. The signs must be so constructed that they can be turned on and off by a crewmember. They must be turned on for each takeoff and each landing and when otherwise considered to be necessary by the pilot in command.

(4) The additional emergency equipment specified in Appendix A of this Part.

(b) *Megaphones.* Each passenger-carrying airplane must have a portable battery-powered megaphone or megaphones readily accessible to the crewmembers assigned to direct emergency evacuation, installed as follows:

(1) One megaphone on each airplane with a seating capacity of more than 60 and less than 100 passengers, at the most rearward location in the passenger cabin where it would be readily accessible to a normal flight attendant

seat. However, the Administrator may grant a deviation from the requirements of this subparagraph if the Administrator finds that a different location would be more useful for evacuation of persons during an emergency.

(2) Two megaphones in the passenger cabin on each airplane with a seating capacity of more than 99 and less than 200 passengers, one installed at the forward end and the other at the most rearward location where it would be readily accessible to a normal flight attendant seat.

(3) Three megaphones in the passenger cabin on each airplane with a seating capacity of more than 199 passengers, one installed at the forward end, one installed at the most rearward location where it would be readily accessible to a normal flight attendant seat, and one installed in a readily accessible location in the mid-section of the airplane.

§ 125.209 Emergency equipment: extended overwater operations.

(a) No person may operate an airplane in extended overwater operations unless it carries, installed in conspicuously marked locations easily accessible to the occupants if a ditching occurs, the following equipment:

(1) An approved life preserver equipped with an approved survivor locator light, or an approved flotation means, for each occupant of the aircraft. The life preserver or other flotation means must be easily accessible to each seated occupant. If a flotation means other than a life preserver is used, it must be readily removable from the airplane.

(2) Enough approved life rafts (with proper buoyancy) to carry all occupants of the airplane, and at least the following equipment for each raft clearly marked for easy identification—

(i) One canopy (for sail, sunshade, or rain catcher);

(ii) One radar reflector (or similar device);

(iii) One life raft repair kit;

(iv) One bailing bucket;

(v) One signaling mirror;

(vi) One police whistle;

(vii) One raft knife;

(viii) One CO_2 bottle for emergency inflation;

(ix) One inflation pump;

(x) Two oars;

(xi) One 75-foot retaining line;

(xii) One magnetic compass;

(xiii) One dye marker;

(xiv) One flashlight having at least two size "D" cells or equivalent;

(xv) At least one approved pyrotechnic signaling device;

(xvi) A 2-day supply of emergency food rations supplying at least 1,000 calories a day for each person;

(xvii) One sea water desalting kit for each two persons that raft is rated to carry, or two pints of water for each person the raft is rated to carry;

(xviii) One fishing kit; and

(xix) One book on survival appropriate for the area in which the airplane is operated.

(b) No person may operate an airplane in extended overwater operations unless there is attached to one of the life rafts required by paragraph (a) of this section, a survival type emergency locator transmitter that meets TSO–C91. Batteries used in this transmitter must be replaced (or recharged, if the batteries are rechargeable) when the transmitter has been in use for more than 1 cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under TSO–C91 has expired. The new expiration date for the replacement or recharged batteries must be legibly marked on the outside of the transmitter. The battery useful life or useful life of charge requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probably storage intervals.

§ 125.211 Seat and safety belts.

(a) No person may operate an airplane unless there are available during the takeoff, en route flight, and landing—

(1) An approved seat or berth for each person on board the airplane who is at least 2 years old; and

(2) An approved safety belt for separate use by each person on board the airplane who is at least 2 years old, except that two persons occupying a berth may share one approved safety belt and two persons occupying a multiple lounge or divan seat may share one approved safety belt during en route flight only.

(b) During the takeoff and landing of an airplane, each person on board shall occupy an approved seat or berth with a separate safety belt properly secured about that person. However, a person who is not at least 2 years old may be held by an adult who is occupying a seat or berth. A safety belt provided for the occupant of a seat may not be used during takeoff and landing by more than one person who is at least 2 years old.

(c) Each sideward facing seat must comply with the applicable requirements of § 25.785(c) of this chapter.

(d) No certificate holder may take off or land an airplane unless each passenger seat back is in the upright position. Each passenger shall comply with instructions given by a crewmember in compliance with this paragraph. This paragraph does not apply to seats on which cargo or persons who are unable to sit erect for a medical reason are carried in accordance with procedures in the certificate holder's manual if the seat back does not obstruct any passenger's access to the aisle or to any emergency exit.

(e) Each occupant of a seat equipped with a shoulder harness must fasten the shoulder harness during takeoff and landing, except that,

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in the case of crewmembers, the shoulder harness need not be fastened if the crewmember cannot perform his required duties with the shoulder harness fastened.

§ 125.213 Miscellaneous equipment.

No person may conduct any operation unless the following equipment is installed in the airplane:

(a) If protective fuses are installed on an airplane, the number of spare fuses approved for the airplane and appropriately described in the certificate holder's manual.

(b) A windshield wiper or equivalent for each pilot station.

(c) A power supply and distribution system that meets the requirements of §§ 25.1309, 25.1331, 25.1351 (a) and (b)(1) through (4), 25.1353, 25.1355, and 25.1431(b) or that is able to produce and distribute the load for the required instruments and equipment, with use of an external power supply if any one power source or component of the power distribution system fails. The use of common elements in the system may be approved if the Administrator finds that they are designed to be reasonably protected against malfunctioning. Engine-driven sources of energy, when used, must be on separate engines.

(d) A means for indicating the adequacy of the power being supplied to required flight instruments.

(e) Two independent static pressure systems, vented to the outside atmospheric pressure so that they will be least affected by air flow variation or moisture or other foreign matter, and installed so as to be airtight except for the vent. When a means is provided for transferring an instrument from its primary operating system to an alternative system, the means must include a positive positioning control and must be marked to indicate clearly which system is being used.

(f) A placard on each door that is the means of access to a required passenger emergency exit to indicate that it must be open during takeoff and landing.

(g) A means for the crew, in an emergency, to unlock each door that leads to a compartment that is normally accessible to passengers and that can be locked by passengers.

§ 125.215 Operating information required.

(a) The operator of an airplane must provide the following materials, in current and appropriate form, accessible to the pilot at the pilot station, and the pilot shall use them:

(1) A cockpit checklist.

(2) An emergency cockpit checklist containing the procedures required by paragraph (c) of this section, as appropriate.

(3) Pertinent aeronautical charts.

(4) For IFR operations, each pertinent navigational en route, terminal area, and approach and letdown chart;

(5) One—engine-inoperative climb performance data and, if the airplane is approved for use in IFR or over-the-top operations, that data must be sufficient to enable the pilot to determine that the airplane is capable of carrying passengers over-the-top or in IFR conditions at a weight that will allow it to climb, with the critical engine inoperative, at least 50 feet a minute when operating at the MEA's of the route to be flown or 5,000 feet a minute when operating at the MEA's of the route to be flown or 5,000 feet MSL, whichever is higher.

(b) Each cockpit checklist required by paragraph (a)(1) of this section must contain the following procedures: (1) Before starting engines; (2) Before takeoff; (3) Cruise; (4) Before landing; (5) After landing; (6) Stopping engines.

(c) Each emergency cockpit checklist required by paragraph (a)(2) of this section must contain the following procedures, as appropriate:

(1) Emergency operation of fuel, hydraulic, electrical, and mechanical systems.

(2) Emergency operation of instruments and controls.

(3) Engine inoperative procedures.

(4) Any other emergency procedures necessary for safety.

§ 125.217 Passenger information.

(a) No person may operate an airplane carrying passengers unless it is equipped with passenger information signs that meet the requirements of § 25.791 of this chapter. The signs must be constructed so that the crewmembers can turn them on and off. They must be turned on for each takeoff and each landing and when otherwise considered to be necessary by the pilot in command.

(b) No passenger or crewmember may smoke while the no smoking sign is lighted and each passenger shall fasten that passenger's seat belt and keep it fastened while the seat belt sign is lighted.

§ 125.219 Oxygen for medical use by passengers.

(a) Except as provided in paragraphs (d) and (e) of this section, no certificate holder may allow the carriage or operation of equipment for the storage, generation or dispensing of medical oxygen unless the unit to be carried is constructed so that all valves, fittings, and gauges are protected from damage during that carriage or operation and unless the following conditions are met:

(1) The equipment must be—

(i) Of an apporved type or in conformity with the manufacturing, packaging, marking, labeling, and maintenance requirements of Title 49 CFR Parts 171, 172, and 173, except § 173.24(a)(1);

(ii) When owned by the certificate holder, maintained under the certificate holder's approved maintenance program;

(iii) Free of flammable contaminants on all exterior surfaces; and

(iv) Appropriately secured.

(2) When the oxygen is stored in the form of a liquid the equipment must have been under the certificate holder's approved maintenance program since its purchase new or since the storage container was last purged.

(3) When the oxygen is stored in the form of a compressed gas as defined in Title 49 CFR § 173.300(a)—

(i) When owned by the certificate holder, it must be maintained under its approved maintenance program; and

(ii) The pressure in any oxygen cylinder must not exceed the rated cylinder pressure.

(4) The pilot in command must be advised when the equipment is on board and when it is intended to be used.

(5) The equipment must be stowed, and each person using the equipment must be seated so as not to restrict access to or use of any required emergency or regular exit or of the aisle in the passenger compartment.

(b) When oxygen is being used, no person may smoke and no certificate holder may allow any person to smoke within 10 feet of oxygen storage and dispensing equipment carried under paragraph (a) of this section.

(c) No certificate holder may allow any person other than a person trained in the use of medical oxygen equipment to connect or disconnect oxygen bottles or any other ancillary component while any passenger is aboard the airplane.

(d) Paragraph (a)(1)(i) of this section does not apply when that equipment is furnished by a professional or medical emergency service for use on board an airplane in a medical emergency when no other practical means of transportation (including any other properly equipped certificate holder) is reasonably available and the person carried under the medical emergency is accompanied by a person trained in the use of medical oxygen.

(e) Each certificate holder who, under the authority of paragraph (d) of this section, deviates from paragraph (a)(1)(i) of this section under a medical emergency shall, within 10 days, excluding Saturdays, Sundays, and Federal holidays, after the deviation, send to the FAA Flight Standards district office charged with the overall inspection of the certificate holder a complete report of the operation involved, including a description of the deviation and the reasons for it.

§ 125.221 Icing conditions: operating limitations.

(a) No pilot may take off an airplane that has—

(1) Frost, snow, or ice adhering to any propeller, windshield, or powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system;

(2) Snow or ice adhering to the wings or stabilizing or control surfaces; or

(3) Any frost adhering to the wings, or stabilizing or control surfaces, unless that frost has been polished to make it smooth.

(b) Except for an airplane that has ice protection provisions that meet Appendix C of this part or those for transport category airplane type certification, no pilot may fly—

(1) Under IFR into known or forecast light or moderate icing conditions; or

(2) Under VFR into known light or moderate icing conditions, unless the airplane has functioning deicing or anti-icing equipment protecting each propeller, windshield, wing, stabilizing or control surface, and each airspeed, altimeter, rate of climb, or flight attitude instrument system.

(c) Except for an airplane that has ice protection provisions that meet Appendix C of this part or those for transport category airplane type certification, no pilot may fly an airplane into known or forecast severe icing conditions.

(d) If current weather reports and briefing information relied upon by the pilot in command indicate that the forecast icing condition that would otherwise prohibit the flight will not be encountered during the flight because of changed weather conditions since the forecast, the restrictions in paragraphs (b) and (c) of this section based on forecast conditions do not apply.

§ 125.223 Airborne weather radar equipment requirements.

(a) No person may operate an airplane governed by this part in passenger-carrying operations unless approved airborne weather radar equipment is installed in the airplane.

(b) No person may begin a flight under IFR or night VFR conditions when current weather reports indicate that thunderstorms, or other potentially hazardous weather conditions that can be detected with airborne weather radar equipment, may reasonably be expected along the route to be flown, unless the airborne weather radar equipment required by paragraph (a) of this section is in satisfactory operating condition.

(c) If the airborne weather radar equipment becomes inoperative en route, the airplane must be operated under the instructions and procedures specified for that event in the manual required by § 125.71.

(d) This section does not apply to airplanes used solely within the State of Hawaii, within the State of Alaska, within that part of Canada west of longitude 130 degrees W, between latitude 70 degrees N, and latitude 53 degrees N, or during any training, test, or ferry flight.

(e) Without regard to any other provision of this part, an alternate electrical power supply is not required for airborne weather radar equipment.

[§ 125.224 Traffic Alert and Collision Avoidance System.

[(a) After December 30, 1991, no person may operate a large airplane that has a passenger seating configuration, excluding any pilot seat, of more than 30 seats unless it is equipped with an approved TCAS II traffic alert and collision avoidance system and the appropriate class of Mode S transponder.

[(b) The manual required by §125.71 of this part shall contain the following information on the TCAS II system required by this section.

[(1) Appropriate procedures for—

[(i) The operation of the equipment; and

[(ii) Proper flightcrew action with respect to the equipment.

[(2) An outline of all input sources that must be operating for the TCAS II to function properly.]

§ 125.225 Flight Recorders.

(a) Except as provided in paragraph (d) of this section, after October 11, 1991, no person may operate a large airplane type certificated before October 1, 1969, for operations above 25,000 feet altitude, nor a multiengine, turbine-powered airplane type certificated before October 1, 1969, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The following information

must be able to be determined within the ranges, accuracies, resolution, and recording intervals specified in Appendix D of this part:

(1) Time;
(2) Altitude;
(3) Airspeed;
(4) Vertical acceleration;
(5) Heading;
(6) Time of each radio transmission to or from air traffic control;
(7) Pitch attitude;
(8) Roll attitude;
(9) Longitudinal acceleration;
(10) Control column or pitch control surface position; and
(11) Trust of each engine.

(b) Except as provided in paragraph (d) of this section, after October 11, 1991, no person may operate a large airplane type certificated after September 30, 1969, for operations above 25,000 feet altitude, nor a multiengine, turbine-powered airplane type certificated after September 30, 1969, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The following information must be able to be determined within the ranges, accuracies, resolutions, and recording intervals specified in Appendix D of this part:

(1) Time;
(2) Altitude;
(3) Airspeed;
(4) Vertical acceleration;
(5) Heading;
(6) Time of each radio transmission either to or from air traffic control;
(7) Pitch attitude;
(8) Roll attitude;
(9) Longitudinal acceleration;
(10) Pitch trim position;
(11) Control column or pitch control surface position;
(12) Control wheel or lateral control surface position;
(13) Rudder pedal or yaw control surface position;
(14) Thrust of each engine;
(15) Position of each thrust reverser;
(16) Trailing edge flap or cockpit flap control position; and
(17) Leading edge flap or cockpit flap control position.

(c) After October 11, 1991, no person may operate a large airplane equipped with a digital data bus and ARINC 717 digital flight data acquisition unit (DFDAU) or equivalent unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. Any parameters specified in Appendix D of this part that are available on the digital data bus must be recorded within the ranges, accuracies, resolution, and sampling intervals specified.

(d) No person may operate under this part an airplane that is manufactured after October 11, 1991, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The parameters specified in Appendix D of this part must be recorded within the ranges, accuracies, resolutions and sampling intervals specified. For the purpose of this section, "manufactured" means the point in time at which the airplane inspection acceptance records reflect that the airplane is complete and meets the FAA-approved type design data.

(e) Whenever a flight recorder required by this section is installed, it must be operated continuously from the instant the airplane begins the takeoff roll until it has completed the landing roll at an airport.

(f) Except as provided in paragraph (g) of this section, and except for recorded data erased as authorized in this paragraph, each certificate holder shall keep the recorded data prescribed in paragraph (a), (b), (c), or (d) of this section, as applicable, until the airplane has been operated for at least 25 hours of the operating time specified in § 125.227(a) of this chapter. A total of 1 hour of recorded data may be erased for the purpose of testing the flight recorder or the flight recorder system. Any erasure made in accordance with this paragraph must be of the oldest recorded data accumulated at the time of

testing. Except as provided in paragraph (g) of this section, no record need be kept more than 60 days.

(g) In the event of an accident or occurrence that requires immediate notification of the National Transportation Safety Board under 49 CFR Part 830 and that results in termination of the flight, the certificate holder shall remove the recording media from the airplane and keep the recorded data required by paragraphs (a), (b), (c), or (d) of this section, as applicable, for at least 60 days or for a longer period upon the request of the Board or the Administrator.

(h) Each flight recorder required by this section must be installed in accordance with the requirements of § 25.1459 of this chapter in effect on August 31, 1977. The correlation required by § 25.1459(c) of this chapter need be established only on one airplane of any group of airplanes:

(1) That are of the same type;

(2) On which the flight recorder models and their installations are the same; and

(3) On which there are no differences in the type design with respect to the installation of the first pilot's instruments associated with the flight recorder. The most recent instrument calibration, including the recording medium from which this calibration is derived, and the recorder correlation must be retained by the certificate holder.

(i) Each flight recorder required by this section that records the data specified in paragraphs (a), (b), (c), or (d) of this section must have an approved device to assist in locating that recorder under water.

§ 125.227 Cockpit voice recorders.

(a) No certificate holder may operate a large turbine engine powered airplane or a large pressurized airplane with four reciprocating engines unless an approved cockpit voice recorder is installed in that airplane and is operated continuously from the start of the use of the checklist (before starting engines for the purpose of flight) to completion of the final checklist at the termination of the flight.

(b) Each certificate holder shall establish a schedule for completion, before the prescribed dates, of the cockpit voice recorder installations required by paragraph (a) of this section. In addition, the certificate holder shall identify any airplane specified in paragraph (a) of this section he intends to discontinue using before the prescribed dates.

(c) The cockpit voice recorder required by this section must also meet the following standards:

(1) The requirements of Part 25 of this chapter in effect after October 11, 1991.

(2) After September 1, 1980, each recorder container must—

(i) Be either bright orange or bright yellow;

(ii) Have reflective tape affixed to the external surface to facilitate its location under water; and

(iii) Have an approved underwater locating device on or adjacent to the container which is secured in such a manner that it is not likely to be separated during crash impact, unless the cockpit voice recorder and the flight recorder, required by § 125.225 of this chapter, are installed adjacent to each other in such a manner that they are not likely to be separated during crash impact.

(d) In complying with this section, an approved cockpit voice recorder having an erasure feature may be used so that, at any time during the operation of the recorder, information recorded more than 30 minutes earlier may be erased or otherwise obliterated.

(e) For those aircraft equipped to record the uninterrupted audio signals received by a boom or a mask microphone the flight crewmembers are required to use the boom microphone below 18,000 feet mean sea level. No person may operate a large turbine-engine powered airplane or a large pressurized airplane with four reciprocating engines manufactured after October 11, 1991, or on which a cockpit voice recorder has been installed after October 11, 1991, unless it is equipped to record the uninterrupted audio signal received by a boom or mask microphone in accordance with § 25.1457(c)(5) of this chapter.

(f) In the event of an accident or occurrence requiring immediate notification of the National

Transportation Safety Board under 49 CFR Part 830 of its regulations, which results in the termination of the flight, the certificate holder shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record is used to assist in determining the cause of accidents or occurrences in connection with investigations under 49 CFR Part 830. The Administrator does not use the record in any civil penalty or certificate action.

Subpart G—Maintenance

§ 125.241 Applicability.

This subpart prescribes rules, in addition to those prescribed in other parts of this chapter, for the maintenance of airplanes, airframes, aircraft engines, propellers, appliances, each item of survival and emergency equipment, and their component parts operated under this part.

§ 125.243 Certificate holder's responsibilities.

(a) With regard to airplanes, including airframes, aircraft engines, propellers, appliances, and survival and emergency equipment, operated by a certificate holder, that certificate holder is primarily responsible for—

(1) Airworthiness;

(2) The performance of maintenance, preventive maintenance, and alteration in accordance with applicable regulations and the certificate holder's manual.

(3) The scheduling and performance of inspections required by this part; and

(4) Ensuring that maintenance personnel make entries in the airplane maintenance log and maintenance records which meet the requirements of Part 43 of this chapter and the certificate holder's manual, and which indicate that the airplane has been approved for return to service after maintenance, preventive maintenance, or alteration has been performed.

§ 125.245 Organization required to perform maintenance, preventive maintenance, and alteration.

The certificate holder must ensure that each person with whom it arranges for the performance of maintenance, preventive maintenance, alteration, or required inspection items identified in the certificate holder's manual in accordance with § 125.249(a) (3) (ii) must have an organization adequate to perform that work.

§ 125.247 Inspection programs and maintenance.

(a) No person may operate an airplane subject to this part unless—

(1) The replacement times for life-limited parts specified in the aircraft type certificate data sheets, or other documents approved by the Administrator, are complied with;

(2) Defects disclosed between inspections, or as a result of inspection, have been corrected in accordance with Part 43 of this chapter; and

(3) The airplane, including airframe, aircraft engines, propellers, appliances, and survival and emergency equipment, and their component parts, is inspected in accordance with an inspection program approved by the Administrator.

(b) The inspection program specified in paragraph (a) (3) of this section must include at least the following:

(1) Instructions, procedures, and standards for the conduct of inspections for the particular make and model of airplane, including necessary tests and checks. The instructions and procedures must set forth in detail the parts and areas of the airframe, aircraft engines, propellers, appliances, and survival and emergency equipment required to be inspected.

(2) A schedule for the performance of inspections that must be performed under the program, expressed in terms of the time in service, calendar time, number of system operations, or any combination of these.

(c) No person may be used to perform the inspections required by this part unless that person is authorized to perform maintenance under Part 43 of this chapter.

(d) No person may operate an airplane subject to this part unless—

(1) The installed engines have been maintained in accordance with the overhaul

periods recommended by the manufacturer or a program approved by the Administrator; and

(2) The engine overhaul periods are specified in the inspection programs required by § 125.247(a)(3).

(e) Inspection programs which may be approved for use under this part include, but are not limited to—

(1) A continuous inspection program which is a part of a current continuous airworthiness program approved for use by a certificate holder under Part 121 or Part 135 of this chapter;

(2) Inspection programs currently recommended by the manufacturer of the airplane, aircraft engines, propellers, appliances, or survival and emergency equipment; or

(3) An inspection program developed by a certificate holder under this part.

§ 125.249 Maintenance manual requirements.

(a) Each certificate holder's manual required by § 125.71 of this part shall contain, in addition to the items required by § 125.73 of this part, at least the following:

(1) A description of the certificate holder's maintenance organization, when the certificate holder has such an organization.

(2) A list of those persons with whom the certificate holder has arranged for performance of inspections under this part. The list shall include the persons' names and addresses.

(3) The inspection programs required by § 125.247 of this part to be followed in the performance of inspections under this part including—

(i) The method of performing routine and nonroutine inspections (other than required inspections);

(ii) The designation of the items that must be inspected (required inspections), including at least those which if improperly accomplished could result in a failure, malfunction, or defect endangering the safe operation of the airplane;

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(iii) The method of performing required inspections;

(iv) Procedures for the inspection of work performed under previously required inspection findings ("buy-back procedures");

(v) Procedures, standards, and limits necessary for required inspections and acceptance or rejection of the items required to be inspected;

(vi) Instructions to prevent any person who performs any item of work from performing any required inspection of that work; and

(vii) Procedures to ensure that work interruptions do not adversely affect required inspections and to ensure required inspections are properly completed before the airplane is released to service.

(b) In addition, each certificate holder's manual shall contain a suitable system which may include a coded system that provides for the retention of the following:

(1) A description (or reference to data acceptable to the Administrator) of the work performed.

(2) The name of the person performing the work and the person's certificate type and number.

(3) The name of the person approving the work and the person's certificate type and number.

§ 125.251 Required inspection personnel.

(a) No person may use any person to perform required inspections unless the person performing the inspection is appropriately certificated, properly trained, qualified, and authorized to do so.

(b) No person may perform a required inspection if that person performed the item of work required to be inspected.

Subpart H—Airman and Crewmember Requirements

§ 125.261 Airman: limitations on use of services.

(a) No certificate holder may use any person as an airman nor may any person serve as an airman unless that person—

(1) Holds an appropriate current airman certificate issued by the FAA;

(2) Has any required appropriate current airman and medical certificates in that person's possession while engaged in operations under this Part; and

(3) Is otherwise qualified for the operation for which that person is to be used.

(b) Each airman covered by paragraph (a) of this section shall present the certificates for inspection upon the request of the Administrator.

§ 125.263 Composition of flightcrew.

(a) No certificate holder may operate an airplane with less than the minimum flightcrew specified in the type certificate and the Airplane Flight Manual approved for that type airplane and required by this Part for the kind of operation being conducted.

(b) In any case in which this Part requires the performance of two or more functions for which an airman certificate is necessary, that requirement is not satisfied by the performance of multiple functions at the same time by one airman.

(c) On each flight requiring a flight engineer, at least one flight crewmember, other than the flight engineer, must be qualified to provide emergency performance of the flight engineer's functions for the safe completion of the flight if the flight engineer becomes ill or is otherwise incapacitated. A pilot need not hold a flight engineer's certificate to perform the flight engineer's functions in such a situation.

§ 125.265 Flight engineer requirements.

(a) No person may operate an airplane for which a flight engineer is required by the type certification requirements without a flight crewmember holding a current flight engineer certificate.

(b) No person may serve as a required flight engineer on an airplane unless, within the preceding 6 calendar months, that person has had at least 50 hours of flight time as a flight engineer on that type airplane, or the Administrator has checked that person on that type airplane and determined that person is familiar and competent with all essential current information and operating procedures.

§ 125.267 Flight navigator and long-range navigation equipment.

(a) No certificate holder may operate an airplane outside the 48 conterminous States and the District of Columbia when its position cannot be reliably fixed for a period of more than 1 hour, without—

(1) A flight crewmember who holds a current flight navigator certificate; or

(2) Two independent, properly functioning, and approved long-range means of navigation which enable a reliable determination to be made of the position of the airplane by each pilot seated at that person's duty station.

(b) Operations where a flight navigator or long-range navigation equipment, or both, are required are specified in the operations specifications of the operator.

§ 125.269 Flight attendants.

(a) Each certificate holder shall provide at least the following flight attendants on each passenger-carrying airplane used:

(1) For airplanes having more than 19 but less than 51 passengers—one flight attendant.

(2) For airplanes having more than 50 but less than 101 passengers—two flight attendants.

(3) For airplanes having more than 100 passengers—two flight attendents plus one additional flight attendant for each unit (or part of a unit) of 50 passengers above 100 passengers.

(b) The number of flight attendants approved under paragraphs (a) and (b) of this section are set forth in the certificate holder's operations specifications.

(c) During takeoff and landing, flight attendants required by this section shall be located as near as practicable to required floor level exits and shall be uniformly distributed throughout the airplane to provide the most effective egress of passengers in event of an emergency evacuation.

§ 125.271 Emergency and emergency evacuation duties.

(a) Each certificate holder, shall, for each type and model of airplane, assign to each category of required crewmember, as appropriate, the necessary functions to be performed in an emergency evacuation. The certificate holder shall show those functions are realistic, can be practically accomplished, and will meet any reasonably anticipated emergency, including the possible incapacitation of individual crewmembers or their inability to reach the passenger cabin because of shifting cargo in combination cargo-passenger airplanes.

(b) The certificate holder shall describe in its manual the functions of each category of required crewmembers under paragraph (a) of this section.

Subpart I—Flight Crewmember Requirements

§ 125.281 Pilot-in-command qualifications.

No certificate holder may use any person, nor may any person serve, as pilot in command of an airplane unless that person—

(a) Holds at least a commercial pilot certificate, an appropriate category, class, and type rating, and an instrument rating; and

(b) Has had at least 1,200 hours of flight time as a pilot, including 500 hours of cross-country flight time, 100 hours of night flight time, including at least 10 night takeoffs and landings, and 75 hours of actual or simulated instrument flight time, at least 50 hours of which were actual flight.

§ 125.283 Second-in-command qualifications.

No certificate holder may use any person, nor may any person serve, as second in command of an airplane unless that person—

(a) Holds at least a commercial pilot certificate with appropriate category and class ratings, and an instrument rating; and

(b) For flight under IFR, meets the recent instrument experience requirements prescribed for a pilot in command in Part 61 of this chapter.

§ 125.285 Pilot qualifications: recent experience.

(a) No certificate holder may use any person, nor may any person serve, as a required pilot flight crewmember unless within the preceding 90 days that person has made at least three takeoffs and landings in the type airplane in

which that person is to serve. The takeoffs and landings required by this paragraph may be performed in a visual simulator approved under § 125.297 to include takeoff and landing maneuvers. However, any person who fails to qualify for a 90-consecutive-day period following the date of that person's last qualification under this paragraph must reestablish recency of experience as provided in paragraph (b) of this section.

(b) A required pilot flight crewmember who has not met the requirements of paragraph (a) of this section may reestablish recency of experience by making at least three takeoffs and landings under the supervision of an authorized check airman, in accordance with the following:

(1) At least one takeoff must be made with a simulated failure of the most critical powerplant.

(2) At least one landing must be made from an ILS approach to the lowest ILS minimums authorized for the certificate holder.

(3) At least one landing must be made to a complete stop.

(c) A required pilot flight crewmember who performs the maneuvers prescribed in paragraph (b) of this section in a visual simulator must—

(1) Have previously logged 100 hours of flight time in the same type airplane in which the pilot is to serve; and

(2) Be observed on the first two landings made in operations under this Part by an authorized check airman who acts as pilot in command and occupies a pilot seat. The landings must be made in weather minimums that are not less than those contained in the certificate holder's operations specifications for Category I operations and must be made within 45 days following completion of simulator testing.

(d) An authorized check airman who observes the takeoffs and landings prescribed in paragraphs (b) and (c)(3) of this section shall certify that the person being observed is proficient and qualified to perform flight duty in operations under this Part, and may require any additional maneuvers that are determined necessary to make this certifying statement.

§ 125.287 Initial and recurrent pilot testing requirements.

(a) No certificate holder may use any person, nor may any person serve as a pilot, unless, since the beginning of the 12th calendar month before that service, that person has passed a written or oral test, given by the Administrator or an authorized check airman on that person's knowledge in the following areas—

(1) The appropriate provisions of Parts 61, 91, and 125 of this chapter and the operations specifications and the manual of the certificate holder;

(2) For each type of airplane to be flown by the pilot, the airplane powerplant, major components and systems, major appliances, performance and operating limitations, standard and emergency operating procedures, and the contents of the approved Airplane Flight Manual or approved equivalent, as applicable;

(3) For each type of airplane to be flown by the pilot, the method of determining compliance with weight and balance limitations for takeoff, landing, and en route operations;

(4) Navigation and use of air navigation aids appropriate to the operation of pilot authorization, including, when applicable, instrument approach facilities and procedures;

(5) Air traffic control procedures, including IFR procedures when applicable;

(6) Meteorology in general, including the principles of frontal systems, icing, fog, thunderstorms, and windshear, and, if appropriate for the operation of the certificate holder, high altitude weather;

(7) Procedures for avoiding operations in thunderstorms and hail, and for operating in turbulent air or in icing conditions; and

(8) New equipment, procedures, or techniques, as appropriate.

(b) No certificate holder may use any person, nor may any person serve, as a pilot in any airplane unless, since the beginning of the 12th calendar month before that service, that person has passed a competency check given by the Administrator or an authorized check airman in that type of airplane to determine that person's competence in practical skills and techniques in

that airplane or type of airplane. The extent of the competency check shall be determined by the Administrator or authorized check airman conducting the competency check. The competency check may include any of the maneuvers and procedures currently required for the original issuance of the particular pilot certificate required for the operations authorized and appropriate to the category, class, and type of airplane involved. For the purposes of this paragraph, type, as to an airplane, means any one of a group of airplanes determined by the Administrator to have a similar means of propulsion, the same manufacturer, and no significantly different handling or flight characteristics.

(c) The instrument proficiency check required by § 125.291 may be substituted for the competency check required by this section for the type of airplane used in the check.

(d) For the purposes of this Part, competent performance of a procedure or maneuver by a person to be used as a pilot requires that the pilot be the obvious master of the airplane with the successful outcome of the maneuver never in doubt.

(e) The Administrator or authorized check airman certifies the competency of each pilot who passes the knowledge or flight check in the certificate holder's pilot records.

(f) Portions of a required competency check may be given in an airplane simulator or other appropriate training device, if approved by the Administrator.

§ 125.289 Initial and recurrent flight attendant crewmember testing requirements.

No certificate holder may use any person, nor may any person serve, as a flight attendant crewmember, unless, since the beginning of the 12th calendar month before that service, the certificate holder has determined by appropriate initial and recurrent testing that the person is knowledgeable and competent in the following areas as appropriate to assigned duties and responsibilities:

(a) Authority of the pilot in command;

(b) Passenger handling, including procedures to be followed in handling deranged persons or other persons whose conduct might jeopardize safety;

(c) Crewmember assignments, functions, and responsibilities during ditching and evacuation of persons who may need the assistance of another person to move expeditiously to an exit in an emergency;

(d) Briefing of passengers;

(e) Location and operation of portable fire extinguishers and other items of emergency equipment;

(f) Proper use of cabin equipment and controls;

(g) Location and operation of passenger oxygen equipment;

(h) Location and operation of all normal and emergency exits, including evacuation chutes and escape ropes; and

(i) Seating of persons who may need assistance of another person to move rapidly to an exit in an emergency as prescribed by the certificate holder's operations manual.

§ 125.291 Pilot in command: instrument proficiency check requirements.

(a) No certificate holder may use any person, nor may any person serve, as a pilot in command of an airplane under IFR unless, since the beginning of the sixth calendar month before that service, that person has passed an instrument proficiency check and the Administrator or an authorized check airman has so certified in a letter of competency.

(b) No pilot may use any type of precision instrument approach procedure under IFR unless, since the beginning of the sixth calendar month before that use, the pilot has satisfactorily demonstrated that type of approach procedure and has been issued a letter of competency under paragraph (g) of this section. No pilot may use any type of nonprecision approach procedure under IFR unless, since the beginning of the sixth calendar month before that use, the pilot has satisfactorily demonstrated either that type of approach procedure or any other two different types of nonprecision approach procedures and has been issued a letter of competency under paragraph (g) of this section. The instrument approach procedure or procedures must include at least one straight-in approach, one circling approach, and one missed approach. Each type of approach procedure demonstrated must be conducted to published minimums for that procedure.

(c) The instrument proficiency check required by paragraph (a) of this section consists of an oral or written equipment test and a flight check under simulated or actual IFR conditions. The equipment test includes questions on emergency procedures, engine operation, fuel and lubrication systems, power settings, stall speeds, best engine-out speed, propeller and supercharge operations, and hydraulic, mechanical, and electrical systems, as appropriate. The flight check includes navigation by instruments, recovery from simulated emergencies, and standard instrument approaches involving navigational facilities which that pilot is to be authorized to use.

(1) For a pilot in command of an airplane, the instrument proficiency check must include the procedures and maneuvers for a commercial pilot certificate with an instrument rating and, if required, for the appropriate type rating.

(2) The instrument proficiency check must be given by an authorized check airman or by the Administrator.

(d) If the pilot in command is assigned to pilot only one type of airplane, that pilot must take the instrument proficiency check required by paragraph (a) of this section in that type of airplane.

(e) If the pilot in command is assigned to pilot more than one type of airplane, that pilot must take the instrument proficiency check required by paragraph (a) of this section in each type of airplane to which that pilot is assigned, in rotation, but not more than one flight check during each period described in paragraph (a) of this section.

(f) Portions of a required flight check may be given in an airplane simulator or other appropriate training device, if approved by the Administrator.

(g) The Administrator or authorized check airman issues a letter of competency to each pilot who passes the proficiency check. The letter of competency contains a list of the types of instrument approach procedures and facilities authorized.

§ 125.293 Crewmember: tests and checks, grace provisions, accepted standards.

(a) If a crewmember who is required to take a test or a flight check under this Part completes the test or flight check in the calendar month before or after the calendar month in which it is required, that crewmember is considered to have completed the test or check in the calendar month in which it is required.

(b) If a pilot being checked under this subpart fails any of the required maneuvers, the person giving the check may give additional training to the pilot during the course of the check. In addition to repeating the maneuvers failed, the person giving the check may require the pilot being checked to repeat any other maneuvers that are necessary to determine the pilot's proficiency. If the pilot being checked is unable to demonstrate satisfactory performance to the person conducting the check, the certificate holder may not use the pilot, nor may the pilot serve, in the capacity for which the pilot is being checked in operations under this Part until the pilot has satisfactorily completed the check.

§ 125.295 Check airman authorization: application and issue.

Each certificate holder desiring FAA approval of a check airman shall submit a request in writing to the FAA Flight Standards district office charged with the overall inspection of the certificate holder. The Administrator may issue a letter of authority to each check airman if that airman passes the appropriate oral and flight test. The letter of authority lists the tests and checks in this Part that the check airman is qualified to give, and the category, class, and type airplane, where appropriate, for which the check airman is qualified.

NOTE—(Compliance with § 125.295 is not required until 30 days after a notice of approval of the requirement of this section by the Office of Management and Budget is published in the Federal Register.)

§ 125.297 Approval of airplane simulators and other training devices.

(a) Airplane simulators and other training devices approved by the Administrator may be used in checks required in this subpart.

(b) Each airplane simulator and other training device that is used in checks required under this subpart must meet the following requirements:

(1) It must be specifically approved for—

(i) The certificate holder;

(ii) The type airplane and, if applicable, the particular variation within type for which the check is being conducted; and

(iii) The particular maneuver procedure, or crewmember function involved.

(2) It must maintain the performance, functional, and other characteristics that are required for approval.

(3) It must be modified to conform with any modification to the airplane being simulated that changes the performance, functional, or other characteristics required for approval.

Subpart J—Flight Operations

§ 125.311 Flight crewmembers at controls.

(a) Except as provided in paragraph (b) of this section, each required flight crewmember on flight deck duty must remain at the assigned duty station with seat belt fastened while the airplane is taking off or landing and while it is en route.

(b) A required flight crewmember may leave the assigned duty station—

(1) If the crewmember's absence is necessary for the performance of duties in connection with the operation of the airplane;

(2) If the crewmember's absence is in connection with physiological needs; or

(3) If the crewmember is taking a rest period and relief is provided—

(i) In the case of the assigned pilot in command, by a pilot qualified to act as pilot in command.

(ii) In the case of the assigned second in command, by a pilot qualified to act as second in command of that airplane during en route operations. However, the relief pilot need not meet the recent experience requirements of § 125.285.

§ 125.313 Manipulation of controls when carrying passengers.

No pilot in command may allow any person to manipulate the controls of an airplane while carrying passengers during flight, nor may any person manipulate the controls while carrying passengers during flight, unless that person is a qualified pilot of the certificate holder operating that airplane.

§ 125.315 Admission to flight deck.

(a) No person may admit any person to the flight deck of an airplane unless the person being admitted is—

(1) A crewmember;

(2) An FAA inspector or an authorized representative of the National Transportation Safety Board who is performing official duties; or

(3) Any person who has the permission of the pilot in command.

(b) No person may admit any person to the flight deck unless there is a seat available for the use of that person in the passenger compartment, except—

(1) An FAA inspector or an authorized representative of the Administrator or National Transportation Safety Board who is checking or observing flight operations; or

(2) A certificated airman employed by the certificate holder whose duties require an airman certificate.

§ 125.317 Inspector's credentials: admission to pilots' compartment: forward observer's seat.

(a) Whenever, in performing the duties of conducting an inspection, an FAA inspector presents an Aviation Safety Inspector credential, FAA Form 110A, to the pilot in command of an airplane operated by the certificate holder, the inspector must be given free and uninterrupted access to the pilot compartment of that airplane. However, this paragraph does not limit the emergency authority of the pilot in command to exclude any person from the pilot compartment in the interest of safety.

(b) A forward observer's seat on the flight deck, or forward passenger seat with headset or speaker, must be provided for use by the Administrator while conducting en route inspections. The suitability of the location of the seat and the headset or speaker for use in conducting en route inspections is determined by the Administrator.

§ 125.319 Emergencies.

(a) In an emergency situation that requires immediate decision and action, the pilot in command may take any action considered necessary under the circumstances. In such a case, the pilot in command may deviate from prescribed operations, procedures and methods, weather minimums, and this chapter, to the extent required in the interests of safety.

(b) In an emergency situation arising during flight that requires immediate decision and action by appropriate management personnel in the case of operations conducted with a flight following service and which is known to them, those personnel shall advise the pilot in command of the emergency, shall ascertain the decision of the pilot in command, and shall have the decision recorded. If they cannot communicate with the pilot, they shall declare an emergency and take any action that they consider necessary under the circumstances.

(c) Whenever emergency authority is exercised, the pilot in command or the appropriate management personnel shall keep the appropriate ground radio station fully informed of the progress of the flight. The person declaring the emergency shall send a written report of any deviation, through the operator's director of operations, to the Administrator within 10 days, exclusive of Saturdays, Sundays, and Federal holidays, after the flight is completed or, in the case of operations outside the United States, upon return to the home base.

NOTE—(Compliance with § 125.319 is not required until 30 days after a notice of approval of the requirement of this section by the Office of Management and Budget is published in the Federal Register.)

§ 125.321 Reporting potentially hazardous meteorological conditions and irregularities of ground and navigation facilities.

Whenever the pilot in command encounters a meteorological condition or an irregularity in a ground or navigational facility in flight, the knowledge of which the pilot in command considers essential to the safety of other flights, the pilot in command shall notify an appropriate ground station as soon as practicable.

§ 125.323 Reporting mechanical irregularities.

The pilot in command shall ensure that all mechanical irregularities occurring during flight are entered in the maintenance log of the airplane at the next place of landing. Before each flight, the pilot in command shall ascertain the status of each irregularity entered in the log at the end of the preceding flight.

NOTE—(Compliance with § 125.323 is not required until 30 days after a notice of approval of the requirement of this section by the Office of Management and Budget is published in the Federal Register.)

§ 125.325 Instrument approach procedures and IFR landing minimums.

No person may make an instrument approach at an airport except in accordance with IFR weather minimums and unless the type of instrument approach procedure to be used is listed in the certificate holder's operations specifications.

§ 125.327 Briefing of passengers before flight.

(a) Before each takeoff, each pilot in command of an airplane carrying passengers shall ensure that all passengers have been orally briefed on—

(1) Smoking;

(2) Use of seat belts;

(3) The placement of seat backs in an upright position before takeoff and landing;

(4) Location and means for opening the passenger entry door and emergency exits;

(5) Location of survival equipment;

(6) If the flight involves extended overwater operation, ditching procedures and the use of required flotation equipment;

(7) If the flight involves operations above 12,000 feet MSL, the normal and emergency use of oxygen; and

(8) Location and operation of fire extinguishers.

(b) Before each takeoff, the pilot in command shall ensure that each person who may need the assistance of another person to move expeditiously to an exit if an emergency occurs and that person's attendant, if any, has received a briefing as to the procedures to be followed if an evacuation occurs. This paragraph does not apply to a person who has been given a briefing before a previous leg of a flight in the same airplane.

(c) The oral briefing required by paragraph (a) of this section shall be given by the pilot in command or a member of the crew. It shall be supplemented by printed cards for the use of each passenger containing—

(1) A diagram and method of operating the emergency exits; and

(2) Other instructions necessary for the use of emergency equipment on board the airplane.

Each card used under this paragraph must be carried in the airplane in locations convenient for the use of each passenger and must contain information that is appropriate to the airplane on which it is to be used.

(d) The certificate holder shall describe in its manual the procedure to be followed in the briefing required by paragraph (a) of this section.

(e) If the airplane does not proceed directly over water after takeoff, no part of the briefing required by paragraph (a)(6) of this section has to be given before takeoff but the briefing required by paragraph (a)(6) must be given before reaching the overwater part of the flight.

§ 125.329 Minimum altitudes for use of autopilot.

(a) Except as provided in paragraphs (b), (c), and (d) of this section, no person may use an autopilot at an altitude above the terrain which is less than 500 feet or less than twice the maximum altitude loss specified in the approved Airplane Flight Manual or equivalent for a malfunction of the autopilot, whichever is higher.

(b) When using an instrument approach facility other than ILS, no person may use an autopilot at an altitude above the terrain that is less than 50 feet below the approved minimum descent altitude for that procedure, of less than twice the maximum loss specified in the approved Airplane Flight Manual or equivalent for a malfunction of the autopilot under approach conditions, whichever is higher.

(c) For ILS approaches when reported weather conditions are less than the basic weather conditions in section 91.105 of this chapter, no person may use an autopilot with an approach coupler at an altitude above the terrain that is less than 50 feet above the terrain, or the maximum altitude loss specified in the approved Airplane Flight Manual or equivalent for the malfunction of the autopilot with approach coupler, whichever is higher.

(d) Without regard to paragraph (a), (b), or (c) of this section, the Administrator may issue operations specifications to allow the use, to touchdown, of an approved flight control guidance system with automatic capability, if—

(1) The system does not contain any altitude loss (above zero) specified in the approved Airplane Flight Manual or equivalent for malfunction of the autopilot with approach coupler; and

(2) The Administrator finds that the use of the system to touchdown will not otherwise adversely affect the safety standards of this section.

§ 125.331 Carriage of persons without compliance with the passenger-carrying provisions of this Part.

The following persons may be carried aboard an airplane without complying with the passenger-carrying requirements of this Part:

(a) A crewmember.

(b) A person necessary for the safe handling of animals on the airplane.

(c) A person necessary for the safe handling of hazardous materials (as defined in Subchapter C of Title 49 CFR).

(d) A person performing duty as a security or honor guard accompanying a shipment made by or under the authority of the U.S. Government.

(e) A military courier or a military route supervisor carried by a military cargo contract operator if that carriage is specifically authorized by the appropriate military service.

(f) An authorized representative of the Administrator conducting an en route inspection.

(g) A person authorized by the Administrator.

Subpart K—Flight Release Rules

§ 125.351 Flight release authority.

(a) No person may start a flight without authority from the person authorized by the certificate holder to exercise operational control over the flight.

(b) No person may start a flight unless the pilot in command or the person authorized by the certificate holder to exercise operational control over the flight has executed a flight release setting forth the conditions under which

the flight will be conducted. The pilot in command may sign the flight release only when both the pilot in command and the person authorized to exercise operational control believe the flight can be made safely, unless the pilot in command is authorized by the certificate holder to exercise operational control and execute the flight release without the approval of any other person.

(c) No person may continue a flight from an intermediate airport without a new flight release if the airplane has been on the ground more than 6 hours.

§ 125.353 Facilities and services.

During a flight, the pilot in command shall obtain any additional available information of meteorological conditions and irregularities of facilities and services that may affect the safety of the flight.

§ 125.355 Airplane equipment.

No person may release an airplane unless it is airworthy and is equipped as prescribed.

§ 125.357 Communication and navigation facilities.

No person may release an airplane over any route or route segment unless communication and navigation facilities equal to those required by § 125.51 are in satisfactory operating condition.

§ 125.359 Flight release under VFR.

No person may release an airplane for VFR operation unless the ceiling and visibility en route, as indicated by available weather reports or forecasts, or any combination thereof, are and will remain at or above applicable VFR minimums until the airplane arrives at the airport or airports specified in the flight release.

§ 125.361 Flight release under IFR or over-the-top.

Except as provided in § 125.363, no person may release an airplane for operations under IFR or over-the-top unless appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the authorized minimums at the estimated time of arrival at the airport or airports to which released.

§ 125.363 Flight release over water.

(a) No person may release an airplane for a flight that involves extended overwater operation unless appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the authorized minimums at the estimated time of arrival at any airport to which released or to any required alternate airport.

(b) Each certificate holder shall conduct extended overwater operations under IFR unless it shows that operating under IFR is not necessary for safety.

(c) Each certificate holder shall conduct other overwater operations under IFR if the Administrator determines that operation under IFR is necessary for safety.

(d) Each authorization to conduct extended overwater operations under VFR and each requirement to conduct other overwater operations under IFR will be specified in the operations specifications.

§ 125.365 Alternate airport for departure.

(a) If the weather conditions at the airport of takeoff are below the landing minimums in the certificate holder's operations specifications for that airport, no person may release an airplane from that airport unless the flight release specifies an alternate airport located within the following distances from the airport of takeoff:

(1) *Airplanes having two engines.* Not more than 1 hour from the departure airport at normal cruising speed in still air with one engine inoperative.

(2) *Airplanes having three or more engines.* Not more than 2 hours from the departure airport at normal cruising speed in still air with one engine inoperative.

(b) For the purposes of paragraph (a) of this section, the alternate airport weather conditions must meet the requirements of the certificate holder's operations specifications.

(c) No person may release an airplane from an airport unless that person lists each required alternate airport in the flight release.

§ 125.367 Alternate airport for destination: IFR or over-the-top.

(a) Except as provided in paragraph (b) of this section, each person releasing an airplane for operation under IFR or over-the-top shall list at least one alternate airport for each destination airport in the flight release.

(b) An alternate airport need not be designated for IFR or over-the-top operations where the airplane carries enough fuel to meet the requirements of §§ 125.375 and 125.377 for flights outside the 48 conterminous States and the District of Columbia over routes without an available alternate airport for a particular airport of destination.

(c) For the purposes of paragraph (a) of this section, the weather requirements at the alternate airport must meet the requirements of the operator's operations specifications.

(d) No person may release a flight unless that person lists each required alternate airport in the flight release.

§ 125.369 Alternate airport weather minimums.

No person may list an airport as an alternate airport in the flight release unless the appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the alternate weather minimums specified in the certificate holder's operations specifications for that airport when the flight arrives.

§ 125.371 Continuing flight in unsafe conditions.

(a) No pilot in command may allow a flight to continue toward any airport to which it has been released if, in the opinion of the pilot in command, the flight cannot be completed safely, unless, in the opinion of the pilot in command, there is no safer procedure. In that event, continuation toward that airport is an emergency situation.

§ 125.373 Original flight release or amendment of flight release.

(a) A certificate holder may specify any airport authorized for the type of airplane as a destination for the purpose of original release.

(b) No person may allow a flight to continue to an airport to which it has been released unless the weather conditions at an alternate airport that was specified in the flight release are forecast to be at or above the alternate minimums specified in the operations specifications for that airport at the time the airplane would arrive at the alternate airport. However, the flight release may be amended en route to include any alternate airport that is within the fuel range of the airplane as specified in § 125.375 or § 125.377.

(c) No person may change an original destination or alternate airport that is specified in the original flight release to another airport while the airplane is en route unless the other airport is authorized for that type of airplane.

(d) Each person who amends a flight release en route shall record that amendment.

§ 125.375 Fuel supply: nonturbine and turbopropeller-powered airplanes.

(a) Except as provided in paragraph (b) of this section, no person may release for flight or take off a nonturbine or turbopropeller-powered airplane unless, considering the wind and other weather conditions expected, it has enough fuel—

(1) To fly to and land at the airport to which it is released;

(2) Thereafter, to fly to and land at the most distant alternate airport specified in the flight release; and

(3) Thereafter, to fly for 45 minutes at normal cruising fuel consumption.

(b) If the airplane is released for any flight other than from one point in the conterminous United States to another point in the conterminous United States, it must carry enough fuel to meet the requirements of subparagraphs (1) and (2) of paragraph (a) of this section and thereafter fly for 30 minutes plus 15 percent of the total time required to fly at normal cruising fuel consumption to the airports specified in subparagraphs (1) and (2) of paragraph (a) of this section, or fly for 90 minutes at normal cruising fuel consumption, whichever is less.

(c) No person may release a nonturbine or turbopropeller-powered airplane to an airport

for which an alternate is not specified under § 125.367(b) unless it has enough fuel, considering wind and other weather conditions expected, to fly to that airport and thereafter to fly for 3 hours at normal cruising fuel consumption.

§ 125.377 Fuel supply: turbine-engine-powered airplanes other than turbopropeller.

(a) Except as provided in paragraph (b) of this section, no person may release for flight or takeoff a turbine-powered airplane (other than a turbopropeller-powered airplane) unless, considering the wind and other weather conditions expected, it has enough fuel—

(1) To fly and land at the airport to which it is released;

(2) Thereafter, to fly to and land at the most distant alternate airport specified in the flight release; and

(3) Thereafter, to fly for 45 minutes at normal cruising fuel consumption.

(b) For any operation outside the 48 conterminous United States and the District of Columbia, unless authorized by the Administrator in the operations specifications, no person may release for flight or take off a turbine-engine powered airplane (other than a turbopropeller-powered airplane) unless, considering wind and other weather conditions expected, it has enough fuel—

(1) To fly and land at the airport to which it is released;

(2) After that, to fly for a period of 10 percent of the total time required to fly from the airport of departure and land at the airport to which it was released;

(3) After that, to fly to and land at the most distant alternate airport specified in the flight release, if an alternate is required; and

(4) After that, to fly for 30 minutes at holding speed at 1,500 feet above the alternate airport (or the destination airport if no alternate is required) under standard temperature conditions.

(c) No person may release a turbine-engine-powered airplane (other than a turbopropeller airplane) to an airport for which an alternate is not specified under § 125.367(b) unless it has enough fuel, considering wind and other weather conditions expected, to fly to that airport and thereafter to fly for at least 2 hours at normal cruising fuel consumption.

(d) The Administrator may amend the operations specifications of a certificate holder to require more fuel than any of the minimums stated in paragraph (a) or (b) of this section if the Administrator finds that additional fuel is necessary on a particular route in the interest of safety.

§ 125.379 Landing weather minimums: IFR.

(a) If the pilot in command of an airplane has not served 100 hours as pilot in command in the type of airplane being operated, the MDA or DH and visibility landing minimums in the certificate holder's operations specification are increased by 100 feet and one-half mile (or the RVR equivalent). The MDA or DH and visibility minimums need not be increased above those applicable to the airport when used as an alternate airport, but in no event may the landing minimums be less than 300-foot ceiling and 1 mile of visibility.

(b) The 100 hours of pilot-in-command experience required by paragraph (a) may be reduced (not to exceed 50 percent) by substituting one landing in operations under this Part in the type of airplane for 1 required hour of pilot-in-command experience if the pilot has at least 100 hours as pilot in command of another type airplane in operations under this Part.

(c) Category II minimums, when authorized in the certificate holder's operations specifications, do not apply until the pilot in command subject to paragraph (a) of this section meets the requirements of that paragraph in the type of airplane the pilot is operating.

§ 125.381 Takeoff and landing weather minimums: IFR.

(a) Regardless of any clearance from ATC, if the reported weather conditions are less than that specified in the certificate holder's operations specifications, no pilot may—

(1) Take off an airplane under IFR; or

(2) Except as provided in paragraph (c) of this section, land an airplane under IFR.

(b) Except as provided in paragraph (c) of this section, no pilot may execute an instrument approach procedure if the latest reported visibility is less than the landing minimums specified in the certificate holder's operations specifications.

(c) If a pilot initiates an instrument approach procedure when the latest weather report indicates that the specified visibility minimums exist, and a later weather report indicating below minimums conditions is received after the airplane—

(1) Is on an ILS final approach and has passed the outer marker,

(2) Is on final approach segment using a nonprecision approach procedure, or

(3) Is on PAR final approach and has been turned over to the final approach controller, the approach may be continued and a landing may be made if the pilot in command finds, upon reaching authorized MAP or DH, that actual weather conditions are at least equal to the minimums prescribed in the operations specifications.

§ 125.383 Load manifest.

(a) Each certificate holder is responsible for the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the airplane. The manifest must be prepared before each takeoff and must include—

(1) The number of passengers;

(2) The total weight of the loaded airplane;

(3) The maximum allowable takeoff and landing weights for that flight;

(4) The center of gravity limits;

(5) The center of gravity of the loaded airplane, except that the actual center of gravity need not be computed if the airplane is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded airplane is within approved limits. In those cases, an entry shall be made on the manifest indicating that the center of gravity is within limits according to a loading schedule or other approved method;

(6) The registration number of the airplane;

(7) The origin and destination; and

(8) Names of passengers.

(b) The pilot in command of an airplane for which a load manifest must be prepared shall carry a copy of the completed load manifest in the airplane to its destination. The certificate holder shall keep copies of completed load manifests for at least 30 days at its principal operations base, or at another location used by it and approved by the Administrator.

Subpart L—Records and Reports

§ 125.401 Crewmember record.

(a) Each certificate holder shall—

(1) Maintain current records of each crewmember that show whether or not that crewmember complies with this chapter (e.g., proficiency checks, airplane qualifications, any required physical examinations, and flight time records); and

(2) Record each action taken concerning the release from employment or physical or professional disqualification of any flight crewmember and keep the record for at least 6 months thereafter.

(b) Each certificate holder shall maintain the records required by paragraph (a) of this section at its principal operations base, or at another location used by it and approved by the Administrator.

(c) Computer record systems approved by the Administrator may be used in complying with the requirements of paragraph (a) of this section.

§ 125.403 Flight release form.

(a) The flight release may be in any form but must contain at least the following information concerning each flight:

(1) Company or organization name.

(2) Make, model, and registration number of the airplane being used.

(3) Date of flight.

(4) Name and duty assignment of each crewmember.

(5) Departure airport, destination airports, alternate airports, and route.

(6) Minimum fuel supply (in gallons or pounds).

(7) A statement of the type of operation (e.g., IFR, VFR).

(b) The airplane flight release must contain, or have attached to it, weather reports, available weather forecasts, or a combination thereof.

§ 125.405 Disposition of load manifest, flight release, and flight plans.

(a) The pilot in command of an airplane shall carry in the airplane to its destination the original or a signed copy of the—

(1) Load manifest required by § 125.383;

(2) Flight release;

(3) Airworthiness release; and

(4) Flight plan, including route.

(b) If a flight originates a the principal operations base of the certificate holder, it shall retain at that base a signed copy of each document listed in paragraph (a) of this section.

(c) Except as provided in paragraph (d) of this section, if a flight originates at a place other than the principal operations base of the certificate holder, the pilot in command (or another person not aboard the airplane who is authorized by the operator) shall, before or immediately after departure of the flight, mail signed copies of the documents listed in paragraph (a) of this section to the principal operations base.

(d) If a flight originates at a place other than the principal operations base of the certificate holder and there is at that place a person to manage the flight departure for the operator who does not depart on the airplane, signed copies of the documents listed in paragraph (a) of this section may be retained at that place for not more than 30 days before being sent to the principal operations base of the certificate holder. However, the documents for a particular flight need not be further retained at that place or be sent to the principal operations base, if the originals or other copies of them have been previously returned to the principal operations base.

(e) The certificate holder shall:

(1) Identify in its operations manual the person having custody of the copies of documents retained in accordance with paragraph (d) of this section; and

(2) Retain at its principal operations base either the original or a copy of the records required by this section for at least 30 days.

§ 125.407 Maintenance log: airplanes.

(a) Each person who takes corrective action or defers action concerning a reported or observed failure or malfunction of an airframe, aircraft engine, propeller, or appliance shall record the action taken in the airplane maintenance log in accordance with Part 43 of this chapter.

(b) Each certificate holder shall establish a procedure for keeping copies of the airplane maintenance log required by this section in the airplane for access by appropriate personnel and shall include that procedure in the manual required by § 125.249.

§ 125.409 Reports of defects or unairworthy conditions.

(a) Each certificate holder shall report the occurrence or detection of each failure, malfunction, or defect, in a form and manner prescribed by the Administrator.

(b) The report must be made within 72 hours to the FAA Flight Standards district office in whose area the certificate holder has its principal operations base. The procedures to be used in complying with this section must be made a part of the manual procedures required by § 125.73(f).

§ 125.411 Airworthiness release or maintenance record entry.

(a) No certificate holder may operate an airplane after maintenance, preventive maintenance, or alteration is performed on the airplane unless the person performing that maintenance, preventive maintenance, or alteration prepares or causes to be prepared—

(1) An airworthiness release; or

(2) An entry in the aircraft maintenance records in accordance with the certificate holder's manual.

(b) The airworthiness release or maintenance record entry required by paragraph (a) of this section must–

(1) Be prepared in accordance with the procedures set forth in the certificate holder's manual;

(2) Include a certification that–

(i) The work was performed in accordance with the requirements of the certificate holder's manual;

(ii) All items required to be inspected were inspected by an authorized person who determined that the work was satisfactorily completed;

(iii) No known condition exists that would make the airplane unairworthy; and

(iv) So far as the work performed is concerned, the airplane is in condition for safe operation; and

(3) Be signed by a person authorized in Part 43 of this chapter to perform maintenance, preventive maintenance, and alteration.

(c) When an airworthiness release form is prepared, the certificate holder must give a copy to the pilot in command and keep a record of it for at least 60 days.

(d) Instead of restating each of the conditions of the certification required by paragraph (c) of this section, the certificate holder may state in its manual that the signature of a person authorized in Part 43 of this chapter constitutes that certification.

Appendix A
Additional Emergency Equipment

(a) *Means for emergency evacuation.* Each passenger-carrying landplane emergency exit (other than over-the-wing) that is more than 6 feet from the ground with the airplane on the ground and the landing gear extended must have an approved means to assist the occupants in descending to the ground. The assisting means for a floor level emergency exit must meet the requirements of § 25.809(f) (1) of this chapter in effect on April 30, 1972, except that, for any airplane for which the application for the type certificate was filed after that date, it must meet the requirements under which the airplane was type certificated. An assisting means that deploys automatically must be armed during taxiing, takeoffs, and landings. However, if the Administrator finds that the design of the exit makes compliance impractical, the Administrator may grant a deviation from the requirement of automatic deployment if the assisting means automatically erects upon deployment and, with respect to required emergency exits, if an emergency evacuation demonstration is conducted in accordance with § 125.189. This paragraph does not apply to the rear window emergency exit of DC-3 airplanes operated with less than 36 occupants, including crewmembers, and less than five exits authorized for passenger use.

(b) *Interior emergency exit marking.* The following must be complied with for each passenger-carrying airplane:

(1) Each passenger emergency exit, its means of access, and means of opening must be conspicuously marked. The identity and location of each passenger emergency exit must be recognizable from a distance equal to the width of the cabin. The location of each passenger emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle. There must be a locating sign—

(i) Above the aisle near each over-the-wing passenger emergency exit, or at another ceiling location if it is more practical because of low headroom;

(ii) Next to each floor level passenger emergency exit, except that one sign may serve two such exits, if they both can be seen readily from that sign; and

(iii) On each bulkhead or divider that prevents fore and aft vision along the passenger cabin, to indicate emergency exits beyond and obscured by it, except that if this is not possible the sign may be placed at another appropriate location.

(2) Each passenger emergency exit marking and each locating sign must meet the following:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, each passenger emergency exit marking and each locating sign must be manufactured to meet the requirements of § 25.812(b) of this chapter in effect on April 30, 1972. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts. The colors may be reversed if it increases the emergency illumination of the passenger compartment. However, the Administrator may authorize deviation from the 2-inch background requirements if the Administrator finds that special circumstances exist that make compliance impractical and that the proposed deviation provides an equivalent level of safety.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, each passenger emergency exit marking and each locating sign must be manufacutured to meet the interior emergency exit marking requirements under which the airplane was type certificated. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 250 microlamberts.

(c) *Lighting for interior emergency exit markings.* Each passenger-carrying airplane must have an emergency lighting system, independent of the main lighting system. However, sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system. The emergency lighting system must—

(1) Illuminate each passenger exit marking and locating sign; and

(2) Provide enough general lighting in the passenger cabin so that the average illumination, when measured at 40-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles.

(d) *Emergency light operation.* Except for lights forming part of emergency lighting subsystems provided in compliance with § 25.812(g) of this chapter (as prescribed in paragraph (h) of this section) that serve no more than one assist means, are independent of the airplane's main emergency lighting systems, and are automatically activated when the assist means is deployed, each light required by paragraphs (c) and (h) must comply with the following:

(1) Each light must be operable manually and must operate automatically from the independent lighting system—

(i) In a crash landing; or

(ii) Whenever the airplane's normal electric power to the light is interrupted.

(2) Each light must—

(i) Be operable manually from the flightcrew station and from a point in the passenger compartment that is readily accessible to a normal flight attendant seat;

(ii) Have a means to prevent inadvertent operation of the manual controls; and

(iii) When armed or turned on at either station, remain lighted or become lighted upon interruption of the airplane's normal electric power.

Each light must be armed or turned on during taxiing, takeoff, and landing. In showing compliance with this paragraph, a transverse vertical separation of the fuselage need not be considered.

(3) Each light must provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.

(e) *Emergency exit operating handles.*

(1) For a passenger-carrying airplane for which the application for the type certificate was filed prior to May 1, 1972, the location of each passenger emergency exit operating handle and instructions for opening the exit must be shown by a marking on or near the exit that is readable from a distance of 30 inches. In addition, for each Type I and Type II emergency exit with a locking mechanism released by rotary motion of the handle, the instructions for opening must be shown by—

(i) A red arrow with a shaft at least ¾ inch wide and a head twice the width of the shaft, extending along at least 70 degrees of arc at a radius approximately equal to ¾ inch of the handle length; and

(ii) The word "open" in red letters 1 inch high placed horizontally near the head of the arrow.

(2) For a passenger-carrying airplane for which the application for the type certificate was filed on or after May 1, 1972, the location of each passenger emergency exit operating handle and instructions for opening the exit must be shown in accordance with the requirements under which the airplane was type certificated. On these airplanes, no operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

(f) *Emergency exit access.* Access to emergency exits must be provided as follows for each passenger-carrying airplane:

(1) Each passageway between individual passenger areas, or leading to a Type I or Type II emergency exit, must be unobstructed and at least 20 inches wide.

(2) There must be enought space next to each Type I or Type II emergency exit to allow a crewmember to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required in paragraph (f)(1) of this section. However, the Administrator may authorize deviation from this requirement for

an airplane certificated under the provisions of Part 4b of the Civil Air Regulations in effect before December 20, 1951, if the Administrator finds that special circumstances exist that provide an equivalent level of safety.

(3) There must be access from the main aisle to each Type III and Type IV exit. The access from the aisle to these exits must not be obstructed by seats, berths, or other protrusions in a manner that would reduce the effectiveness of the exit. In addition—

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the access must meet the requirements of § 25.813(c) of this chapter in effect on April 30, 1972; and

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the access must meet the emergency exit access requirements under which the airplane was certificated.

(4) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway must not be obstructed. However, curtains may be used if they allow free entry through the passageway.

(5) No door may be installed in any partition between passenger compartments.

(6) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door must have a means to latch it in open position, and the door must be latched open during each takeoff and landing. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate interia forces, relative to the surrounding structure, listed in § 25.561(b) of this chapter.

(g) *Exterior exit markings.* Each passenger emergency exit and the means of opening that exit from the outside must be marked on the outside of the airplane. There must be a 2-inch colored band outlining each passenger emergency exit on the side of the fuselage. Each outside marking, including the band, must be readily distinguishable from the surrounding fuselage area by contrast in color. The markings must comply with the following:

(1) If the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent. "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives.

(2) If the reflectance of the darker color is greater than 15 percent, at least a 30 percent difference between its reflectance and the reflectance of the lighter color must be provided.

(3) Exits that are not in the side of the fuselage must have the external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background color, in bright chrome yellow and, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side.

(h) *Exterior emergency lighting and escape route.*

(1) Each passenger-carrying airplane must be equipped with exterior lighting that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.812(f) and (g) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the exterior emergency lighting requirements under which the airplane was type certificated.

(2) Each passenger-carrying airplane must be equipped with a slip-resistant escape route that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.803(e) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the slip-resistant escape route requirements under which the airplane was type certificated.

(i) *Floor level exits.* Each floor level door or exit in the side of the fuselage (other than those leading into a cargo or baggage compartment that is not accessible from the passenger cabin) that is 44 or more inches high and 20 or more inches wide, but not wider than 46 inches, each passenger ventral exit (except the ventral exits on M-404 and CV-240 airplanes) and each tail cone exit must meet the requirements of this section for floor level emergency exits. However, the Administrator may grant a deviation from this paragraph if the Administrator finds that circumstances make full compliance impractical and that an acceptable level of safety has been achieved.

(j) *Additional emergency exits.* Approved emergency exits in the passenger compartments that are in excess of the minimum number of required emergency exits must meet all of the applicable provisions of this section except paragraph (f), (1), (2), and (3) and must be readily accessible.

(k) On each large passenger-carrying turbojet-powered airplane, each ventral exit and tailcone exit must be—

(1) Designed and constructed so that it cannot be opened during flight; and

(2) Marked with a placard readable from a distance of 30 inches and installed at a conspicuous location near the means of opening the exit, stating that the exit has been designed and constructed so that it cannot be opened during flight.

Appendix B
Criteria for Demonstration of Emergency Evacuation Procedures Under § 125.189

(a) *Aborted takeoff demonstration.*

(1) The demonstration must be conducted either during the dark of the night or during daylight with the dark of the night simulated. If the demonstration is conducted indoors during daylight hours, it must be conducted with each window covered and each door closed to minimize the daylight effect. Illumination on the floor or ground may be used, but it must be kept low and shielded against shining into the airplane's windows or doors.

(2) The airplane must be in a normal ground attitude with landing gear extended.

(3) Stands or ramps may be used for descent from the wing to the ground. Safety equipment such as mats or inverted life rafts may be placed on the ground to protect participants. No other equipment that is not part of the airplane's emergency evacuation equipment may be used to aid the participants in reaching the ground.

(4) The airplane's normal electric power sources must be deenerigized.

(5) All emergency equipment for the type of passenger-carrying operation involved must be installed in accordance with the certificate holder's manual.

(6) Each external door and exit and each internal door or curtain must be in position to simulate a normal takeoff.

(7) A representative passenger load of persons in normal health must be used. At least 30 percent must be females. At least 5 percent must be over 60 years of age with a proportionate number of females. At least 5 percent, but not more than 10 percent, must be children under 12 years of age, prorated through that age group. Three life-size dolls, not included as part of the total passenger load, must be carried by passengers to simulate live infants 2 years old or younger. Crewmembers, mechanics, and training personnel who maintain or operate the airplane in the normal course of their duties may not be used as passengers.

(8) No passenger may be assigned a specific seat except as the Administrator may require. Except as required by item (12) of this paragraph, no employee of the certificate holder may be seated next to an emergency exit.

(9) Seat belts and shoulder harnesses (as required) must be fastened.

(10) Before the start of the demonstration, approximately one-half of the total average amount of carry-on baggage, blankets, pillows, and other similar articles must be distributed at several locations in the aisles and emergency exit access ways to create minor obstructions.

(11) The seating density and arrangement of the airplane must be representative of the highest capacity passenger version of that airplane the certificate holder operates or proposes to operate.

(12) Each crewmember must be a member of a regularly scheduled line crew, must be seated in that crewmember's normally assigned seat for takeoff, and must remain in that seat until the signal for commencement of the demonstration is received.

(13) No crewmember or passenger may be given prior knowledge of the emergency exits available for the demonstration.

(14) The certificate holder may not practice, rehearse, or describe the demonstration for the participants nor may any participant have taken part in this type of demonstration within the preceding 6 months.

(15) The pretakeoff passenger briefing required by § 125.327 may be given in accordance with the certificate holder's manual. The passengers may also be warned to follow directions of crewmembers, but may not be instructed on the procedures to be followed in the demonstration.

(16) If safety equipment as allowed by item (3) of this section is provided, either all

passenger and cockpit windows must be blacked out or all of the emergency exits must have safety equipment to prevent disclosure of the available emergency exits.

(17) Not more than 50 percent of the emergency exits in the sides of the fuselage of an airplane that meet all of the requirements applicable to the required emergency exits for that airplane may be used for the demonstration. Exits that are not to be used in the demonstration must have the exit handle deactivated or must be indicated by red lights, red tape or other acceptable means, placed outside the exits to indicate fire or other reason that they are unusable. The exits to be used must be representative of all of the emergency exits on the airplane and must be designated by the certificate holder, subject to approval by the Administrator. At least one floor level exit must be used.

(18) All evacuees, except those using an over-the-wing exit, must leave the airplane by a means provided as part of the airplane's equipment.

(19) The certificate holder's approved procedures and all of the emergency equipment that is normally available, including slides, ropes, lights, and megaphones, must be fully utilized during the demonstration.

(20) The evacuation time period is completed when the last occupant has evacuated the airplane and is on the ground. Evacuees using stands or ramps allowed by item (3) above are considered to be on the ground when they are on the stand or ramp; *Provided*, That the acceptance rate of the stand or ramp is no greater than the acceptance rate of the means available on the airplane for descent from the wing during an actual crash situation.

(b) *Ditching demonstration.* The demonstration must assume that daylight hours exist outside the airplane and that all required crewmembers are available for the demonstration.

(1) If the certificate holder's manual requires the use of passengers to assist in the launching of liferafts, the needed passengers must be aboard the airplane and participate in the demonstration according to the manual.

(2) A stand must be placed at each emergency exit and wing with the top of the platform at a height simulating the water level of the airplane following a ditching.

(3) After the ditching signal has been received, each evacuee must don a life vest according to the certificate holder's manual.

(4) Each liferaft must be launched and inflated according to the certificate holder's manual and all other required emergency equipment must be placed in rafts.

(5) Each evacuee must enter a liferaft and the crewmembers assigned to each liferaft must indicate the location of emergency equipment aboard the raft and describe its use.

(6) Either the airplane, a mockup of the airplane, or a floating device simulating a passenger compartment must be used.

(i) If a mockup of the airplane is used, it must be a life-size mockup of the interior and representative of the airplane currently used by or proposed to be used by the certificate holder and must contain adequate seats for use of the evacuees. Operation of the emergency exits and the doors must closely simulate that on the airplane. Sufficient wing area must be installed outside the over-the-wing exits to demonstrate the evacuation.

(ii) If a floating device simulating a passenger compartment is used, it must be representative, to the extent possible, of the passenger compartment of the airplane used in operations. Operation of the emergency exits and the doors must closely simulate operation on that airplane. Sufficient wing area must be installed outside the over-the-wing exits to demonstrate the evacuation. The device must be equipped with the same survival equipment as is installed on the airplane, to accommodate all persons participating in the demonstration.

Appendix C
Ice Protection

If certification with ice protection provisions is desired, compliance with the following must be shown:

(a) The recommended procedures for the use of the ice protection equipment must be set forth in the Airplane Flight Manual.

(b) An analysis must be performed to establish, on the basis of the airplane's operational needs, the adequacy of the ice protection system for the various components of the airplane. In addition, tests of the ice protection system must be conducted to demonstrate that the airplane is capable of operating safely in continuous maximum and intermittent maximum icing conditions as described in Appendix C of Part 25 of this chapter.

(c) Compliance with all or portions of this section may be accomplished by reference, where applicable because of similarity of the designs, to analyses and tests performed by the applicant for a type certificated model.

[APPENDIX D—AIRPLANE FLIGHT RECORDER SPECIFICATION]

Parameters	Range	Accuracy sensor input to DFDR readout	Sampling interval (per second)	Resolution [4] read out
Time (GMT or Frame Counter) (range 0 to 4095, sampled 1 per frame).	24 Hrs	±0.125% Per Hour	0.25 (1 per 4 seconds).	1 sec.
Altitude	−1,000 ft to max certificated altitude of aircraft.	±100 to ±700 ft (See Table 1, TSO-C51a).	1	5' to 35' [1]
Airspeed	50 KIAS to V_{so} and V_{so} to 1.2 V_D	±5%, ±3%	1	1 kt.
Heading	360°	±2°	1	0.5°
Normal Acceleration (Vertical)	−3g to +6g	±1% of max range excluding datum error of ±5%.	8	0.01g.
Pitch Attitude	±75°	±2°	1	0.5°
Roll Attitude	±180°	±2°	1	0.5°
Radio Transmitter Keying	On-Off (Discrete)		1	
Thrust/Power on Each Engine	Full range forward	±2%	1	0.2% [2]
Trailing Edge Flap or Cockpit Control Selection.	Full range or each discrete position	±3° or as pilot's indicator	0.5	0.5% [2]
Leading Edge Flap or Cockpit Control Selection.	Full range or each discrete position	±3° or as pilot's indicator	0.5	0.5% [2]
Thrust Reverser Position	Stowed, in transit, and reverse (Discrete)		1 (per 4 seconds per engine).	
Ground Spoiler Position/Speed Brake Selection.	Full range or each discrete position	±2% unless higher accuracy uniquely required.	1	0.2% [2]
Marker Beacon Passage	Discrete		1	
Autopilot Engagement	Discrete		1	
Longitudinal Acceleration	±1g	±1.5% max range excluding datum error of ±5%.	4	0.01g.
Pilot Input and/or Surface Position-Primary Controls (Pitch, Roll, Yaw) [3].	Full range	±2° unless higher accuracy uniquely required.	1	0.2% [2]
Lateral Acceleration	±1g	±1.5% max range excluding datum error of ±5%.	4	0.01g.
Pitch Trim Position	Full range	±3% unless higher accuracy uniquely required.	1	0.3% [2]
Glideslope Deviation	±400 Microamps	±3%	1	0.3% [2]
Localizer Deviation	±400 Microamps	±3%	1	0.3% [2]
AFCS Mode and Engagement Status	Discrete		1	
Radio Altitude	−20 ft to 2,500 ft	±2 Ft or ±3% Whichever is Greater Below 500 Ft and ±5% Above 500 Ft.		1 ft + 5% [2] above 500'
Master Warning	Discrete		1	
Main Gear Squat Switch Status	Discrete		1	
Angle of Attack (if recorded directly)	As installed	As installed	2	0.3% [2]
Outside Air Temperature or Total Air Temperature.	−50°C to +90°C	±2°C	0.5	0.3°C
Hydraulics, Each System Low Pressure	Discrete		0.5	or 0.5% [2]
Groundspeed	As installed	Most Accurate Systems Installed (IMS Equipped Aircraft Only).	1	0.2% [2]

If additional recording capacity is available, recording of the following parameters is recommended. The parameters are listed in order of significance:

Drift Angle	When available. As installed	As installed	4	
Wind Speed and Direction	When available. As installed	As installed	4	
Latitude and Longitude	When available. As installed	As installed	4	
Brake pressure/Brake pedal position	As installed	As installed	1	
Additional engine parameters:				
EPR	As installed	As installed	1 (per engine)	
N1	As installed	As installed	1 (per engine)	
N2	As installed	As installed	1 (per engine)	
EGT	As installed	As installed	1 (per engine)	
Throttle Lever Position	As installed	As installed	1 (per engine)	
Fuel Flow	As installed	As installed	1 (per engine)	
TCAS:				
TA	As installed	As installed	1	
RA	As installed	As installed	1	
Sensitivity level (as selected by crew).	As installed	As installed	2	
GPWS (ground proximity warning system)	Discrete		1	
Landing gear or gear selector position	Discrete		0.25 (1 per 4 seconds).	
DME 1 and 2 Distance	0–200 NM;	As installed	0.25	1 mi.
Nav 1 and 2 Frequency Selection	Full range	As installed	0.25	

[1] When altitude rate is recorded. Altitude rate must have sufficient resolution and sampling to permit the derivation of altitude to 5 feet.
[2] Percent of full range.
[3] For airplanes that can demonstrate the capability of deriving either the control input on control movement (one from the other) for all modes of operation and flight regimes, the "or" applies. For airplanes with non-mechanical control systems (fly-by-wire) the "and" applies. In airplanes with split surfaces, suitable combination of inputs is acceptable in lieu of recording each surface separately.
[4] This column applies to aircraft manufactured after October 11, 1991.]

Special Federal Aviation Regulation 38-2
Certification and Operating Requirements

Adopted: May 28, 1985 **Effective: June 4, 1985**

(Published in 50 FR 23941, June 7, 1985)

SUMMARY: These amendments: (1) Specify and clarify the type of certificate and operations specifications an operator may be issued consistent with the scope and type of its operations; (2) specify and clarify the certification requirements the operator must meet with respect to each type of operation in order to be eligible to have a specified type of operation authorized in its operations specifications; (3) clarify the regulations with which an operator must comply in the conduct of the operations specified; (4) include provisions regarding Part 125 and other regulations which have been promulgated since the adoption of Special Federal Aviation Regulation (SFAR) No. 38 and eliminate provisions that relate to Part 123 and other regulations that are no longer applicable; (5) authorize certain operators of transport category airplanes having a maximum passenger seating configuration, excluding any required crewmember seat, of 30 seats or less and a maximum payload capacity of 7,500 pounds or less to operate under the provisions of Part 121 rather than Part 135 when a specific authorization is obtained from the Administrator (the related "pass-through" provision of SFAR 38 is deleted); (6) require rotorcraft operations that may currently be subject to Parts 121 and 127 to be conducted under Part 135; and (7) include the substance of present Part 129 applicability in order to provide a comprehensive listing of certification and operations specifications requirements.

FOR FURTHER INFORMATION CONTACT: Mr. Larry Bedore, Project Development Branch, Air Transportation Division, Office of Flight Operations, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591, telephone (202) 472-4621.

SUPPLEMENTARY INFORMATION:

Background

On January 30, 1985, the FAA issued Notice of Proposed Rulemaking (NPRM) No. 85-3 (50 FR 4472). This Notice proposed to revise SFAR 38 primarily to specify and clarify FAA requirements for operating certificates and for operations specifications for persons who operate under Federal Aviation Regulations Parts 121 and 135. The Notice was issued to bring SFAR 38 up to date in view of changes in the regulations and in the aviation industry that had occurred since it was issued in 1978 and also as part of the FAA's continuing response to the sunset of the Civil Aeronautics Board.

This amendment updates SFAR 38 in light of changes since 1978 and clarifies those provisions in SFAR 38 that state which FAA regulations apply to a particular air carrier for the type of operation the air carrier is conducting in the areas summarized below. A fuller discussion of each area is contained in the preamble to NPRM 85-3.

One of the purposes of this amendment is to clearly define, for each type of operation (e.g., scheduled common carriage within the United States, all-cargo operations, scheduled common carriage outside the United States, etc.): (1) The type of certificate, (2) the certification requirements, (3) the operations specifications, and (4) the regulations within the applicable Parts of the FAR with which an operator must comply when conducting each type of operation.

As amended, SFAR 38-2 makes it clear that wherever the term "commuter air carrier" appears in Part 135 of the FAR, it shall be deemed to mean a holder of an "Air Carrier Operating Certificate" that is conducting scheduled passenger carrying operations with a frequency of operations of at least five round trips per week on at least one route between two or more points according to published flight schedules. This frequency of operations is a standard currently accepted by the industry and the FAA for air carrier certification and operation rules. However, this definition would not apply to Part 93 of the FAR. Further, a regulation that applies to a commuter air carrier will be deemed to mean a regulation that applies to scheduled passenger-carrying operations conducted under Part 135.

SFAR 38-2 allows the Administrator to authorize an air carrier who would otherwise be subject to Part 135 to elect to conduct its operations with transport category airplanes under Part 121. However, an air carrier is not allowed to operate airplanes subject to Part 121 under Part 135.

SFAR 38-2 does not reference § 135.2, and any air carrier conducting its operations under the "pass-through" provision is required to conduct its operations under Part 135, unless it receives authorization from the Administrator to conduct its operation under Part 121.

SFAR 38 is updated by adding provisions which reference Part 125 which became effective February 3, 1981, and deletes the provisions relating to Part 123 which was revoked effective January 1, 1983.

SFAR 38-2 requires rotorcraft operations that are now conducted under Part 121 or Part 127 to be conducted under Part 135. The amendment, in effect, suspends Part 127 and §§ 121.13 and 121.157(e), and requires all rotorcraft operations to be conducted under Part 135.

As amended, SFAR 38-2 includes the substance of the applicability of present Part 129 in order to provide for a comprehensive listing of certification and operations specifications requirements.

SFAR 38 as revised by this amendment will be effective until May 1, 1986, unless sooner superseded or revoked.

Comments on Proposed SFAR 38-2

During the comment period, the FAA received 15 comments. The limited number of comments received and the tone of the comments indicate overall substantial agreement with proposed SFAR 38-2. A few commenters recommended minor changes or raised questions about certain provisions of SFAR 38-2.

One commenter questioned whether the opening sentence of SFAR 38-2 which reads "Contrary provisions of Parts 121, 125, 127, 129, and 135 of the Federal Aviation Regulations notwithstanding," may create confusion. The "notwithstanding" clause is a carryover from original SFAR 38 and it does not appear to have caused the kind of confusion the commenter suggests.

Four commenters request that the phrase "passenger seating capacity" in proposed paragraphs 4(a) and 4(b) be changed to "passenger seating configuration" as it is in current SFAR 38 paragraphs 2(a) and (b) and 3(a) and (b). The reason is that the proposed wording would mean that if an aircraft has been certificated for a certain maximum seating capacity, that figure would be the compliance factor, rather than the number of installed passenger seats in the aircraft. The FAA did not intend to change the criteria for compliance and has, therefore, changed the language back to "passenger seating configuration" as it appears in the provisions of present SFAR 38 cited above.

For consistency of language within SFAR 38-2 and also for consistency of application of the FAR, the term "passenger seating capacity" in paragraph 5(a), which related to Part 125 has also been changed to "passenger seating configuration" even though Part 125 (section 125.1(a)) presently uses "seating capacity." The FAA does not consider this a substantive change since Part 125 has been applied on the basis of seating "configuration" rather than seating "capacity."

One commenter objected to the phrase "certain procedures" used in Section 3 as being unclear. The commenter suggested changing "certain procedures" to "appropriate regulations." The FAA does not agree. The term "certain procedures" refers to procedures that may be included in operations specifications to reflect requirements imposed on a specific operator in addition to the Federal Aviation Regulations. Examples would include specific procedures that might be tied in with a deviation or an exemption approved for that carrier. The commenter also objected to the phrase "size of aircraft" in Section 3 as not being sufficiently specific. The commenter suggested changing "size of aircraft" to "seating and payload capacity." The commenter's point is valid and has been

adopted by inclusion of a definition of "size of aircraft" in Section 6(c). Also, in Section 1(a) and in Section 3, the word "type" in reference to type of aircraft, has been changed to "class" to make it clear that the distinction intended is not between types of aircraft (e.g., B-727, DC-8, etc.) but rather between classes of aircraft (e.g., airplane, rotorcraft, etc.).

One commenter suggests that the preamble statements regarding CAB sunset be updated to show that a finding of fitness is a continuing requirement under the sunset legislation and that the Department of Transportation now has this function formerly handled by the CAB. The FAA agrees. The NPRM preamble was written before the 1984 amendments to the Airline Deregulation Act of 1978, (Pub. L. 98-443, October 4, 1984) which stipulated that DOT will continue the CAB function of determining fitness.

One commenter objects to the explanation in the preamble concerning confusion as to applicable regulations resulting from the sunset of the CAB. This commenter states that an FAA policy change, rather than confusion, was responsible for the FAA's requiring 21 carriers to shift from the supplemental rules of Part 121 to the domestic or flag rules of Part 121, as appropriate. This point was addressed in the preamble to the proposed revision of SFAR 38 as follows:

"It is the FAA's position that an air carrier certificated under current SFAR 38 in accordance with the rules of Part 121 must, if it is engaged in scheduled passenger operations, operate in accordance with the rules applicable to domestic or flag air carriers as required by § 121.3(a) or § 121.3(c) and be issued domestic and flag operations specifications. Furthermore, it is the FAA's position that an air carrier engaged in nonscheduled passenger-carrying operations must operate in accordance with the rules applicable to supplemental air carriers in accordance with § 121.3(e) and be issued supplemental operations specifications. The FAA has issued interpretive material to explain the correct application of these rules, but believes that the regulations should be clarified."

These 21 operators now have the appropriate operations specifications and have been brought in compliance with the applicable regulations in Part 121 so that this revision of SFAR 38 imposes no burden.

This commenter also thought that elimination of the "pass-through" provision in paragraph 2(d) of SFAR 38 would impose a similar burden. However, the inclusion of paragraph 4(b) as proposed allows persons operating transport category airplanes to obtain approval from the Administrator to conduct those operations under the appropriate provisions of Part 121. This provision is less limited than the original pass-through provision (which applied only to operations existing on December 1, 1978) and applies only when requested by the operator and approved by the Administrator.

Two commenters object to the definition of "commuter air carriers." One of the commenters seems to object to applying the term "commuter" to air carriers who are operating under Part 121 domestic rules, but who are operating propeller driven aircraft of less than 60 seats. Such operators consider themselves to be "regional" air carriers who compete equally with other types of air carriers. However, the definition of commuter air carriers does not apply to operations under Part 121 because it applies only to operations under Part 135 with aircraft having a maximum passenger seating configuration of 30 seats or less and a maximum payload capacity of 7,500 pounds or less.

A second commenter objects to provisions in the definition of "commuter air carriers" that state that frequency of operations is "at least five round trips per week on at least one route between two or more points . . . ." The commenter objects on the basis that the definition constitutes a public convenience and necessity requirement and that the authority domestically to issue a Certificate of Public Convenience and Necessity for domestic operations was terminated by Congress on January 1, 1982. In response, the FAA does not intend by this definition to create a public convenience and necessity requirement in the "commuter air carrier" definition. The definition has been used historically in Part 135 to refer to scheduled operations as opposed to non-scheduled. To preclude a change in the operations requirements prescribed in SFAR 38, the commuter

air carrier route and frequency stipulation is needed in the SFAR 38-2 definition in order to continue to exclude those operators who may fly fewer than five round trips per week from certain commuter air carrier requirements prescribed in Part 135.

A commenter objected to the definition of "scheduled operations." According to the commenter, the definition would require charter operators to be issued domestic air carrier operations specifications if they were to contract for a series of public charters. The FAA does not agree that this definition includes legitimate charter operations. Scheduled operations by definition depart at a stated time and place and are readily available to the general public. While, on occasion, "charter" flights are "announced" in advance, the charter operator normally does not commit to having the flight operate unless a minimum load of passengers is booked in advance. Thus, the general public cannot depend upon a chartered flight maintaining a schedule (for example, there may be a last minute flight cancellation because not enough passengers signed up for the flight) as they can on a scheduled flight. An operator who attempts to hold itself out as a charter operator but who, in fact, announces regularly scheduled flights to the public would be considered a scheduled operator and would have to comply with the regulations for scheduled operations under Part 121 or Part 135, as appropriate.

Two commenters expressed concern that the definition of "air carriers" in Section 6(c)(1) would require all indirect "air carriers" to have operating certificates and operations specifications under Section 1(c) which states that "no person may operate without, or in violation of, a certificate and operations specifications issued under this SFAR."

While it is true, as these commenters point out, that the Federal Aviation Act of 1958 defines "air carrier" to include one who acts "indirectly," the FAA has never extended its air carrier regulations to persons who are legitimately engaged in indirect operations such as bona fide freight forwarder. SFAR 38-2 does not treat indirect operators any differently than current SFAR 38 and so there is no substantive change. However, this does not mean that an indirect air carrier can avoid air carrier certification requirements if, in fact, that carrier is engaged in the operation of aircraft or exercises its authority over initiating, conducting, or terminating a flight or flights.

One commenter states that the application of Part 135 is somewhat open-ended with respect to rotorcraft having a passenger seating configuration of more than 30 seats or a maximum payload capacity of more than 7,500 pounds. The commenter states that in their responses to other rulemaking proposals concerning rotorcraft, such as Notice No. 85-8 (50 FR 10144, March 13, 1985), industry groups must now consider future operations of larger helicopters under Part 135. In response, the FAA notes that the proposal to require all sizes of rotorcraft to be operated under Part 135 is based on the recognition that there are significant deficiencies in Parts 121 and 127 that must be addressed before authorizing any rotorcraft operations under those rules. The issuance of special operations specifications is identified in the preamble of the proposal as an option to permit the operation of larger rotorcraft under Part 135. In the meantime, Exemptions Nos. 4109 and 4297 have been issued to two operators to permit the operation of BV-234 helicopters under Part 135. The FAA recognizes that additional rulemaking is needed to adequately cover the operation of rotorcraft having a passenger seating configuration of more than 30 seats, excluding any required crewmember seat, or a payload capacity of more than 7,500 pounds. In the interim, since Part 135 does not presently address that size rotorcraft, operators of these rotorcraft will be issued special operations specifications which will provide for the appropriate level of safety required for that size aircraft. New paragraphs 4(d) and 5(d) are added to this SFAR to clarify this point, and to spell out what was intended in the NPRM.

Three commenters suggest changes which are beyond the scope of this Notice of Proposed Rulemaking. As stated earlier in this notice and in the NPRM, this rulemaking updates and clarifies SFAR-38; it does not substantively revise the basic applicability of the affected parts. Therefore, these recommendations for substantive change beyond the scope of Notice 85-3 have not been considered in this rulemaking.

Good Cause Justification for Immediate Adoption

The termination date for SFAR 38 as extended by SFAR 38–1, is June 1, 1985. There are numerous operating certificates issued under the provisions of SFAR 38, as amended. In order to avoid confusion in the administration of FAA regulations regarding operating certificates and operating requirements, it is necessary that this amendment be effective as soon as possible. Therefore, I find that good cause exists for making this amendment effective in less than 30 days.

Economic Impact

The FAA evaluated the economic impact of this amendment. This amendment is not expected to cause an adverse economic impact on the regulated parties because it is essentially clarifying in nature. The findings of FAA's evaluation are summarized below and a copy of the regulatory evaluation is contained in the docket.

The rule (1) Specifies and clarifies certification requirements and regulations operators must comply with in conducting specific operations, (2) includes regulations that have been promulgated and deletes references to regulations that have been withdrawn since the adoption of SFAR 38, and (3) suspends regulations that are no longer applicable.

As previously pointed out, it is the FAA's position that the current regulations require scheduled operations in airplanes with more than 30 passenger seats to be conducted under the domestic or flag air carrier rules. Therefore, as the result of this rule, there should be minimal economic impact on the approximately 21 carriers previously discussed. Accordingly, a full economic evaluation is not required. Notwithstanding the above position, an evaluation was performed. This evaluation reveals that a small net benefit will accrue to the affected carriers because costs that may result from having to comply with the domestic and flag rules would be more than offset by cost savings associated with relaxation of reserve fuel requirements.

SFAR 38–2 suspends Part 127 and requires all rotorcraft carriers currently operating under Parts 121 and 127 to conduct their operations under Part 135. Such a change is expected to enhance safety because Part 135 contains safety related requirements for rotorcraft not specified in either Part 121 or 127. This rule will not generate any additional costs to regulated parties. At present, only two carriers, under exemption authority, operate rotorcraft with a capacity in excess of 30 seats or a 7,500-pound payload under Part 135. These rotorcraft would normally be subject to the provisions of Part 121 or 127. Moreover, commuter operations with large rotorcraft currently do not appear feasible at locations where the geographical distribution of service points make rotorcraft operations viable.

Trade Impact Statement

The FAA finds that the amendment will have no impact on international trade.

Regulatory Flexibility Determination

The FAA finds that the amendment will have no consequential economic impact on small entities. Accordingly, the FAA finds that an initial regulatory flexibility analysis is not required by the Regulatory Flexibility Act.

Conclusion

For the reasons stated under the heading "Economic Impact," the FAA has determined that this document involves a rule which: (1) Is not a major rule under Executive Order 12291, and (2) is not a significant rule under Department of Transportation Regulatory Policies and Procedures (44 FR 11034; Feb. 26, 1979). Also, for the reasons stated under the heading "Trade Impact Statement and Regulatory Flexibility Determination," I certify that the rule will not have a substantial economic impact on a substantial number of small entities. The total projected impact of the amendment may be found in a copy of the regulatory evaluation contained in the public

docket. A copy of that evaluation may be obtained by contacting the person identified above under the caption "FOR FURTHER INFORMATION CONTACT."

THE AMENDMENT

In consideration of the above, SFAR 38 (14 CFR Parts 121, 125, 127, 129, and 135 is revised effective June 4, 1985.

Authority: 49 U.S.C. 1354(a), 1421, 1423, 1424, and 1502; 49 U.S.C. 106(g) (revised Pub. L. 97-449, January 12, 1983).

Special Federal Aviation Regulation 38-3
Certification and Operating Requirements
Adopted: April 30, 1986 **Effective: May 8, 1986**

(Published in 51 FR 17274, May 9, 1986)

SUMMARY: These amendment extends the effectiveness of Special Federal Aviation Regulations (SFAR) No. 38-2 (50 FR 23941; June 7, 1985). SFAR 38- revised SRAR 38 primarily by specifying and clarifying FAA requirements for operating certificates and operations specifications for persons who operate under Federal Aviation Regulations (FAR) Parts 121 and 135. The amendment brought SFAR 38 up to date in view of changes in the regulations and the aviation industry that had occurred since it was issued in 1978 and also as part of the FAA's response to the sunset of the Civil Aeronautics Board (CAB). Having generally reviewed the FAA regulations to determine the most appropriate response to the Airline Deregulation Act of 1978 (ADA) and the termination of CAB functions attendant on the CAB sunset, the FAA now concludes that it is necessary to extend the termination date of SFAR 38-2 to allow time for the FAA, in a separate rulemaking action, to propose and receive comments on the incorportaion of SFAR 38-2 into the FAR. The termination date for SFAR 38-2 is extended to June 1, 1987. The FAA intends to publish a notice rescinding SFAR 38-2 and a final rule incorporating SFAR 38-2 into the FAR concurrently in the Federal Register.

Comments must be received on or before June 9, 1986.

ADDRESSES: Send comments on the rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-204), Docket No. 18510, 800 Independence Avenue, S.W., Washington, D.C. 20591, or deliver comments in duplicate to: Federal Aviation Administration, Rules Docket, Room 916, 800 Independence Avenue, S.W., Washington, D.C. Comments may be examined in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Mr. Michael Coffey, Project Development Branch, AFS-240, Air Transportation Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, telephone (202) 426-8096.

Background

On December 12, 1978, the FAA promulgated SFAR 38 in consequence of the ADA (Pub. L. 95-504, 92 Stat. 1705). That Act embodies the Congressional intent that the Federal Government diminish its involvement in regulating the economic aspects of the airline industry. To accomplish this, Congress directed that the CAB be abolished on December 31, 1984. Anticipating its sunset, the CAB curtailed or suspended much of its regulatory activity during the period 1979-1984. On October 4, 1984, additional legislation was enacted further defining the process of CAB sunset. On Janusry 1, 1985, those remaining CAB functions were transferred to the Department of Transportation (DOT).

Because some aspects of FAA safety regulation relied upon CAB definitions and authority, the FAA found it necessary in 1978 to adopt an interim measure to provide for an orderly transition from CAB and FAA interlocking authority ω a regulatory regime

with no CAB in existence. This action was consistent with the Congressional directive contained in Section 107(a) of the Act that the deregulation of airline economics result in no diminution of the high standard of safety in air transportation which existed when the ADA was enacted. SFAR 38 set forth FAA certification and operating requirements applicable to all "air commerce" and " air transportation" operations for "compensation or hire" (SFAR 38 did not address Part 133 External Load Operations, Part 137 Agriculture Aircraft Operations, or Part 91 training and other special purpose operations.)

On December 27, 1984, the FAA adopted SFAR 38–1 which merely extended the termination date of the regulation, and allowed the FAA time to propose and receive comments on revising SFAR 38.

On May 28, 1985, the FAA adopted SFAR 38–2, which updated SFAR 38 in light of changes since 1978 and clarified provisions that state which FAA regulations apply to each air carrier and each type of operation. This action was necessary because of the changes in the air transportation industry brought about by economic deregulation. Before deregulation, economic certificates were fairly rigidly compartmentalized and each air carrier typically was authorized to conduct only one type of operation (domestic, flag, or charter (supplemental)). The safety certificate issued to the air carrier by the FAA paralleled the authorization granted in the air carrier's economic certificate. Economic deregulation broke down the barriers between the various types of operations. The economic authority granted an air carrier by the DOT is no longer indicative of the safety regulations applicable to the type of operation authorized by the FAA. Thus, it was necessary for the FAA to establish guidelines to determine what safety standards were applicable to an air carrier's particular operation.

Good Cause Justification for Immediate Adoption

The termination date for SFAR 38–2 and the operating cedrtificates issued under SFAR 38, as amended, is May 1, 1986. The reasons which justified the adoption, and the subsequent revision, of SFAR 38 still exist. The FAA is currently preparing a Notice of Proposed Rulemaking (NPRM) which will consolidate the certification rules now in Parts 121 and 135 into a new Part of the FAR. This NPRM will also propose incorporating the necessary portions of SFAR 38–2 into the FAR. Therefore, it is in the public interest to extend the termination date of SFAR 38–2 from May 1, 1986 to June 1, 1987, although the FAA anticipates that a final rule incorporating SFAR 38–2 in the FAR will be published before then. If it is, a notice rescinding SFAR 38–2 will be published concurrently. This action is necessary to permit continued operations under operating certificates issued under SFAR 38, as amended, and to avoid confusion in the administration of FAA regulations regarding operating certificates and operating requirements.

In addition, since this amendment continues in effect the provisions of a currently effective SFAR and imposes no additional burden on any person, I find that notice and public procedures are unnecessary, impracticable, and contrary to the public interest, and that the amendment should be made effective in less than 30 days after publication. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address above. All communications received on or before the close of the comment period will be considered by the Administrator, and this amendment may be changed in light of the comments received. All comments will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested parties.

Trade Impact Statement

The FAA finds that this amendment will have no impact on international trade.

Conclusion

The FAA has determined that this document involves a rule change which imposes no additional burden on any person. Accordingly, it has been determined that: the rule change does not involve a major rule under Executive Order 12291; it is not significant

under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and its anticipated impact is so minimal that a full regulatory evaluation is not required.

Adoption of the Amendment

In consideration of the foregoing, SFAR 38-2 (14 CFR Parts 121, 125, 127, 129, and 135) of the Federal Aviation Regulations is effective May 8, 1986.

The authority citation for SFAR 38-2 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1421, 1423, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Special Federal Aviation Regulation 38-4

Certification and Operating Requirements

Adopted: July 15, 1987 **Effective: August 4, 1987**

(Published in 52 FR 28938, August 4, 1987)

SUMMARY: This amendment reinstates Special Federal Aviation Regulation (SFAR) No. 38-2 (50 FR 23941; June 7, 1985) and establishes a new termination date. The SFAR 38-2 was previously amended by SFAR 38-3 (51 FR 17274; May 9, 1986) to extend its termination date to allow time for the FAA, in a separate rulemaking action, to prepare a Notice of Proposed Rulemaking (NPRM) that would consolidate the certification rules now in Parts 121 and 135 into a new part of the FAR. This NPRM would also propose incorporating the necessary portions of SFAR 38-2 into the FAR. Having generally reviewed the FAA regulations to determine the most appropriate response to the Airline Deregulation Act of 1978 (ADA) and the termination of CAB functions following the CAB sunset, the FAA now concludes that it is necessary to renew the effectiveness of SFAR 38-2 and to establish a new termination date to allow time for the FAA to complete the rulemaking process that will consolidate the certification rules and incorporate SFAR 38-2 into the FAR. The termination date for reinstated SFAR 38-2 is June 1, 1989. The FAA intends to publish a notice rescinding SFAR 38-2 and a final rule incorporating SFAR 38-2 into the FAR concurrently in the Federal Register.

Comments must be received on or before October 5, 1987.

ADDRESSES: Send comments on the rule in duplicate to Federal Aviation Administration, Office of the Chief Counsel, Attn.: Rule Docket (AGC-204), Docket No. 18518, 800 Independence Avenue S.W., Washington, DC 20591, or deliver comments in duplicate to: Federal Aviation Administration, Rule Docket, Room 916, 800 Independence Avenue S.W., Washington, DC. Comments may be examined in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Mr. Michael Coffey, Project Development Branch, AFS-240, Air Transportation Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue S.W., Washington, DC 20591. Telephone (202) 267-3750.

SUPPLEMENTARY INFORMATION:

Background

On December 12, 1978, the FAA promulgated SFAR 38 (43 FR 58366; December 14, 1978) in consequence of the ADA (Pub. L. 95-504, 92 Stat. 1705). That Act expresses the Congressional intent that the Federal Government diminish its involvement in regulating the economic aspects of the airline industry. To accomplish this, Congress directed that the CAB be abolished on December 31, 1984, and that various of its functions cease before that date. Anticipating its sunset, the CAB itself curtailed or suspended much of its regulatory activity during the period 1979-1984. On October 4, 1984, additional legislation was enacted further defining the process of CAB sunset. On January 1, 1985, the remaining CAB functions were transferred to the Department of Transportation (DOT).

Because some aspects of FAA safety regulation relied upon CAB definitions and authority, the FAA found it necessary in 1978 to adopt an interim measure to provide for an orderly transition from CAB and FAA interlocking authority to a regulatory regime with no CAB in existence. This action was consistent with the Congressional directive contained in Section 107(a) of the Act that the deregulation of airline economics result in no diminution of the high standards of safety in air transportation that existed when the ADA was enacted. The SFAR 38 set forth FAA certification and operating requirements applicable to all "air commerce" and "air transportation" operations for "compensaton or hire." (SFAR 38 did no address Part 133 External Load Operations, Part 137 Agriculture Aircraft Operations, or Part 91 training and other special purpose operations.)

On December 27, 1984, the FAA adopted SFAR 38-1 (50 FR 450; January 4, 1985), which merely extended the termination date of the regulation and allowed the FAA time to propose and receive comments on revising SFAR 38.

On May 28, 1985, the FAA adopted SFAR 38-2, which updated SFAR 38 in light of changes since 1978 and clarified provisions stating which FAA regulations apply to each air carrier and each type of

operation. This action was necessary because of the changes in the air transportation industry brought about by economic deregulation. Before deregulation, economic certificates were fairly rigidly compartmentalized and each air carrier typically was authorized to conduct only one type of operation (domestic, flag, or charter (supplemental)). The safety certificate issued to the air carrier by the FAA paralleled the authorization granted in the air carrier's economic certificate. Economic deregulation broke down the barriers between the various types of operations. The economic authority granted an air carrier by the DOT is no longer indicative of the safety regulations applicable to the type of operation authorized by the FAA. Thus, it was necessary for the FAA to establish guidelines to determine what safety standards were applicable to an air carrier's particular operation.

On May 8, 1986, the FAA adopted SFAR 38-3, which merely extended the termination date of SFAR 38-2 to allow the FAA time to incorporate its contents into an NPRM that will propose consolidation of the certification rules in Parts 121 and 135, and will incorporate various provisions of SFAR 38-2 into a new part of the FAR.

Good Cause Justification For Immediate Adoption

Because of unavoidable, administrative delays, SFAR 38-2 terminated on June 1, 1987. The reasons which justified the adoption, and the subsequent revision, of SFAR 38 still exist. Therefore, it is in the public interest to reinstate SFAR 38-2 and to establish a new termination date of June 1, 1989, although the FAA anticipates that a final rule incorporating SFAR 38-2 into the FAR will be published before then. If it is, a notice rescinding SFAR 38-2 will be published concurrently. This action is necessary to permit continued operations under SFAR 38, as amended, and to avoid confusion in the administration of FAA regulations regarding operating certificates and operating requirements.

For this reason, and because this amendment continues in effect the provisions of a currently effective SFAR and imposes no additional burden on any person, I find that notice and public procedures are unnecessary, impracticable, and contrary to the public interest, and that the amendment should be made effective in less than 30 days after publication. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address above. All communications received on or before the close of the comment period will be considered by the Administrator, and this amendment may be changed in light of the comments received. All comments will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested parties.

Trade Impact Statement

The FAA finds that this amendment will have no impact on international trade.

Conclusion

The FAA has determined that this document involves an amendment that imposes no additional burden on any person. Accordingly, it has been determined that: The action does not involve a major rule under Executive Order 12291; it is not significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and its anticipated impact is so minimal that a full regulatory evaluation is not required.

Adoption of the Amendment

In consideration of the foregoing, SFAR 38-2 (14 CFR Parts 121, 125, 127, 129, and 135) of the Federal Aviation Regulations is reinstated, effective August 4, 1987.

The authority citation for Part 125 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g) (revised Pub. L. 97-449, January 12, 1983).

[Special Federal Aviation Regulation 38-2
Certification and Operating Requirements

Index

[*Section*

1. Applicability.
   (a) (1) Certificates.
   (a) (2) Certification requirements.
   (a) (3) Operating requirements.
   (b) Operations conducted under more than one paragraph.
   (c) Prohibition against operating without certificate or in violation of operations specifications.
2. Certificates and foreign air carrier operations specifications.
   (a) Air Carrier Operating Certificate.
   (b) Operating Certificate.
   (c) Foreign air carrier operations specifications.
3. Operations specifications.
4. Air carriers and those commercial operators engaged in scheduled intrastate common carriage.
   (a) (1) Airplanes, more than 30 seats/7,500 pounds payload, scheduled within 48 States.
   (a) (2) Airplanes, more than 30 seats/7,500 pounds payload, scheduled outside 48 States.
   (a) (3) Airplanes, more than 30 seats/7,500 pounds payload, not scheduled and all cargo.
   (b) Airplanes, 30 seats or less/7,500 or less pounds payload.
   (c) Rotorcraft, 30 seats or less/7,500 pounds or less payload.
   (d) Rotorcraft, more than 30 seats/more than 7,500 pounds payload.
5. Operations conducted by a person who is not engaged in air carrier operations, but is engaged in passenger operations, cargo operations, or both, as a commercial operator.
   (a) Airplanes, 20 or more seats/6,000 or more pounds payload.
   (b) Airplanes, less than 20 seats/less than 6,000 pounds payload.
   (c) Rotorcraft, 30 seats or less/7,500 pounds or less payload.
   (d) Rotorcraft, more than 30 seats/more than 7,500 pounds payload.
6. Definitions.
   (a) Terms in FAR.
      (1) Domestic/flag/supplemental/commuter.
      (2) ATCO.
   (b) FAR references to:
      (1) Domestic air carriers.
      (2) Flag air carriers.
      (3) Supplemental air carriers.
      (4) Commuter air carriers.
   (c) SFAR terms.
      (1) Air carrier.
      (2) Commercial operator.
      (3) Foreign air carrier.
      (4) Scheduled operations.
      (5) Size of aircraft.
      (6) Maximum payload capacity.
      (7) Empty weight.
      (8) Maximum zero fuel weight.
      (9) Justifiable aircraft equipment.]

[Special Federal Aviation Regulation 38-2

[Contrary provisions of Parts 121, 125, 127, 129, and 135 of the Federal Aviation Regulations notwithstanding—

1. *Applicability.*

(a) This Special Federal Aviation Regulation applies to persons conducting commercial passenger operations, cargo operations, or both, and prescribes—

(1) The types of operating certificates issued by the Federal Aviation Administration;

(2) The certification requirements an operator must meet in order to obtain and hold operations specifications for each type of operation conducted and each class and size of aircraft operated; and

(3) The operating requirements an operator must meet in conducting each type of operation and in operating each class and size of aircraft authorized in its operations specifications.

A person shall be issued only one certificate and all operations shall be conducted under that certificate, regardless of the type of operation or the class or size of aircraft operated. A person holding an air carrier operating certificate may not conduct any operations under the rules of Part 125.

(b) Persons conducting operations under more than one paragraph of this SFAR shall meet the certification requirements specified in each paragraph and shall conduct operations in compliance with the requirements of the Federal Aviation Regulations specified in each paragraph for the operation conducted under that paragraph.

(c) Except as provided under this SFAR, no person may operate as an air carrier or as a commercial operator without, or in violation of, a certificate and operations specifications issued under this SFAR.

2. *Certificates and foreign air carrier operations specifications.*

(a) Persons authorized to conduct operations as an air carrier will be issued an Air Carrier Operating Certificate.

(b) Persons who are not authorized to conduct air carrier operations, but who are authorized to conduct passenger, cargo, or both, operations as a commercial operator will be issued an Operating Certificate.

(c) FAA certificates are not issued to foreign air carriers. Persons authorized to conduct operations in the United States as a foreign air carrier who hold a permit issued under Section 402 of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1372), or other appropriate economic or exemption authority issued by the appropriate agency of the United States of America will be issued operations specifications in accordance with the requirements of Part 129 and shall conduct their operations within the United States in accordance with those requirements.

3. *Operations specifications.*

The operations specifications associated with a certificate issued under paragraph 2(a) or (b) and the operations specifications issued under paragraph 2(c) of this SFAR will prescribe the authorizations, limitations and certain procedures under which each type of operation shall be conducted and each class and size of aircraft shall be operated.

4. *Air carriers, and those commercial operators engaged in scheduled intrastate common carriage.*

Each person who conducts operations as an air carrier or as a commercial operator engaged in scheduled intrastate common carriage of persons or property for compensation or hire in air commerce with—

(a) Airplanes having a passenger seating configuration of more than 30 seats, excluding any required crewmember seat, or a payload capacity of more than 7,500 pounds, shall comply with the certification requirements in Part 121, and conduct its—

(1) Scheduled operations within the 48 contiguous states of the United States and the District of Columbia, including routes that extend outside the United States that are specifically authorized by the Administrator, with those airplanes in accordance with the]

[requirements of Part 121 applicable to domestic air carriers, and shall be issued operations specifications for those operations in accordance with those requirements.

(2) Scheduled operations to points outside the 48 contiguous states of the United States and the District of Columbia with those airplanes in accordance with the requirements of Part 121 applicable to flag air carriers, and shall be issued operations specifications for those operations in accordance with those requirements.

(3) All-cargo operations and operations that are not scheduled with those airplanes in accordance with the requirements of Part 121 applicable to supplemental air carriers, and shall be issued operations specifications for those operations in accordance with those requirements; except the Administrator may authorize those operations to be conducted under paragraph (4) (a) (1) or (2) of this paragraph.

(b) Airplanes having a maximum passenger seating configuration of 30 seats or less, excluding any required crewmember seat, and a maximum payload capacity of 7,500 pounds or less, shall comply with the certification requirements in Part 135, and conduct its operations with those airplanes in accordance with the requirements of Part 135, and shall be issued operations specifications for those operations in accordance with those requirements; except that the Administrator may authorize a person conducting operations in transport category airplanes to conduct those operations in accordance with the requirements of paragraph 4(a) of this paragraph.

(c) Rotorcraft having a maximum passenger seating configuration of 30 seats or less and a maximum payload capacity of 7,500 pounds or less shall comply with the certification requirements in Part 135, and conduct its operations with those aircraft in accordance with the requirements of Part 135, and shall be issued operations specifications for those operations in accordance with those requirements.

(d) Rotorcraft having a passenger seating configuration of more than 30 seats or a payload capacity of more than 7,500 pounds shall comply with the certification requirements in Part 135, and conduct its operations with those aircraft in accordance with the requirements of Part 135, and shall be issued special operations specifications for those operations in accordance with those requirements and this SFAR.

5. *Operations conducted by a person who is not engaged in air carrier operations, but is engaged in passenger operations, cargo operations, or both, as a commercial operator.*

Each person, other than a person conducting operations under paragraph 2(c) or 4 of this SFAR, who conducts operations with—

(a) Airplanes having a passenger seating configuration of 20 or more, excluding any required crewmember seat, or a maximum payload capacity of 6,000 pounds or more, shall comply with the certification requirements in Part 125, and conduct its operations with those airplanes in accordance with the requirements of Part 125, and shall be issued operations specifications in accordance with those requirements, or shall comply with an appropriate deviation authority.

(b) Airplanes having a maximum passenger seating configuration of less than 20 seats, excluding any required crewmember seat, and a maximum payload capacity of less than 6,000 pounds shall comply with the certification requirements in Part 135, and conduct its operations in those airplanes in accordance with the requirements of Part 135, and shall be issued operations specifications in accordance with those requirements.

(c) Rotorcraft having a maximum passenger seating configuration of 30 seats or less and a maximum payload capacity of 7,500 pounds or less shall comply with the certification requirements in Part 135, and conduct its operations in those aircraft in accordance with the requirements of Part 135, and shall be issued operations specifications for those operations in accordance with those requirements.

(d) Rotorcraft having a passenger seating configuration of more than 30 seats or a payload capacity of more than 7,500 pounds shall comply with the certification requirements in Part 135, and conduct its operations with those aircraft in accordance with the requirements of Part 135, and shall be issued special operations specifications for those operations in accordance with those requirements and this SFAR.]

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[6. *Definitions.*

(a) Wherever in the Federal Aviation Regulations the terms—

(1) "Domestic air carrier operating certificate," "flag air carrier operating certificate," "supplemental air carrier operating certificate," or "commuter air carrier" (in the context of Air Carrier Operating Certificate) appears, it shall be deemed to mean an "Air Carrier Operating Certificate" issued and maintained under this SFAR.

(2) "ATCO operating certificate" appears, it shall be deemed to mean either an "Air Carrier Operating Certificate" or "Operating Certificate," as is appropriate to the context of the regulation. All other references to an operating certificate shall be deemed to mean an "Operating Certificate" issued under this SFAR unless the context indicates the reference is to an Air Carrier Operating Certificate.

(b) Wherever in the Federal Aviation Regulations a regulation applies to—

(1) "Domestic air carriers," it will be deemed to mean a regulation that applies to scheduled operations solely within the 48 contiguous states of the United States and the District of Columbia conducted by persons described in paragraph 4(a) (1) of this SFAR.

(2) "Flag air carriers," it will be deemed to mean a regulation that applies to scheduled operations to any point outside the 48 contiguous states of the United States and the District of Columbia conducted by persons described in paragraph 4(a) (2) of this SFAR.

(3) "Supplemental air carriers," it will be deemed to mean a regulation that applies to charter and all-cargo operations conducted by persons described in paragraph 4(a) (3) of this SFAR.

(4) "Commuter air carriers," it will be deemed to mean a regulation that applies to scheduled passenger carrying operations, with a frequency of operations of at least five round trips per week on at least one route between two or more points according to the published flight schedules, conducted by persons described in paragraph 4(b) or (c) of this SFAR. This definition does not apply to Part 93 of this chapter.

(c) For the purpose of this SFAR, the term—

(1) "Air carrier" means a person who meets the definition of an air carrier as defined in the Federal Aviation Act of 1958, as amended.

(2) "Commercial operator" means a person, other than an air carrier, who conducts operations in air commerce carrying persons or property for compensation or hire.

(3) "Foreign air carrier" means any person other than a citizen of the United States, who undertakes, whether directly or indirectly or by lease or any other arrangement, to engage in foreign air transportation.

(4) "Scheduled operations" means operations that are conducted in accordance with a published schedule for passenger operations which includes dates or times (or both) that is openly advertised or otherwise made readily available to the general public.

(5) "Size of aircraft" means an aircraft's size as determined by its seating configuration or payload capacity, or both.

(6) "Maximum payload capacity" means:

(i) For an aircraft for which a maximum zero fuel weight is prescribed in FAA technical specifications, the maximum zero fuel weight, less empty weight, less all justifiable aircraft equipment, and less the operating load (consisting of minimum flight crew, foods and beverages, and supplies and equipment related to foods and beverages, but not including disposable fuel or oil).

(ii) For all other aircraft, the maximum certificated takeoff weight of an aircraft, less the empty weight, less all justifiable aircraft equipment, and less the operating load (consisting of minimum fuel load, oil, and flightcrew). The allowance for the weight of the crew, oil, and fuel is as follows:

(A) Crew—200 pounds for each crewmember required by the Federal Aviation Regulations.]

(B) Oil—350 pounds.

(C) Fuel—the minimum weight of fuel required by the applicable Federal Aviation Regulations for a flight between domestic points 174 nautical miles apart under VFR weather conditions that does not involve extended overwater operations.

(7) "Empty weight" means the weight of the airframe, engines, propellers, rotors, and fixed equipment. Empty weight excludes the weight of the crew and payload, but includes the weight of all fixed ballast, unusable fuel supply, undrainable oil, total quantity of engine coolant, and total quantity of hydraulic fluid.

(8) "Maximum zero fuel weight" means the maximum permissible weight of an aircraft with no disposable fuel or oil. The zero fuel weight figure may be found in either the aircraft type certificate data sheet, or the approved Aircraft Flight Manual, or both.

(9) "Justifiable aircraft equipment" means any equipment necessary for the operation of the aircraft. It does not include equipment or ballast specifically installed, permanently or otherwise, for the purpose of altering the empty weight of an aircraft to meet the maximum payload capacity.

This Special Federal Aviation Regulation No. 38-2 terminates [June 1, 1989], or the effective date of the codification of SFAR 38-2 into the Federal Aviation Regulations, whichever occurs first.

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